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ABSTRACT

The course aims to train migrant health personnel to recognize and identify adverse sanitary conditions related to the migrant farmworkers' living and working environments, and to outline approaches for the presentation and alleviation of health hazards through the referral of recognized sanitary deficiencies and code violations to responsible regulatory agencies. Key content areas include epidemiology of migrant health, sanitation factors affecting migrant health and characteristics, and minimum legal sanitation standards and enforcement procedures and referral procedures. Divided into five sections, this manual presents the content areas in a sequence that promotes developmental understanding of knowledge, concepts and skills, and relates specific content areas to other content areas. The sections are (1) Introduction--provides the major points of the orientation session; (2) ABCs of Migrant Health--includes reading and reference material on the complex and interrelated factors of migrant health and of migrant health epidemiology; (3) Sanitation Factors--covers the overall relation of sanitation factors to the epidemiology of migrant health, sewage and solid waste sanitation, disease vector control, and housing, food and water sanitation factors; (4) Pesticides--includes an "Informational Booklet on Pesticides" and a detailed outline on pesticides; and (5) The Law and Code Regulations--focuses on the Occupational Safety and Health Act. (NQ)

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A Five Day Training Course

for

Migrant Health Project Personnel

in the

Surveillance of Health Hazards of Sanitation Conditions

in the Working and Living Environments of Migrant Farmworkers

Prepared for:

The Bureau of Community Health Services
Migrant Health Division
Department of Health, Education and Welfare
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OSHA Practice Manual

InterAmerica

MAIN OFFICE: WASHINGTON, D. C.
FIELD OFFICES: SAN ANTONIO, TEXAS
FRESNO, CALIFORNIA
LAWRENCE, KANSAS

Dear Participant:

On behalf of InterAmerica Research Associates and the Bureau of Community Health Services, let me welcome you to this five day training course. The purpose of this course is to develop and increase your capabilities to recognize and identify adverse sanitary conditions related to the migrant farmworkers' living and working environments, and to outline approaches available to you for the presentation and alleviation of health hazards through the referral of recognized sanitary deficiencies and code violations to responsible regulatory agencies.

This is a big order....and to that end we must recognize that this is a working conference. Our approach, based on cummulative years of training experience, is designed to promote and facilitate an acquisition of new knowledge, skills, and feelings, as well as stimulate your further development. We will share and learn through participative experiences.

On the following pages you will find the training agenda, the text of a "resource manual", and an introduction on how to use the "resource manual".

Our training staff will be available to assist you in making your participation in this course a success and in increasing your capability of being a more effective health project staff person.

Sincerely,

Carlos Besinaiz
Project Director

2001 Wisconsin Avenue, N.W. • Suite 275 • Washington, D. C. 20007

Phone 202—333-4900

AGENDA

A Training Conference for Migrant Health Project Personnel in the Surveillance of Health Hazards of Sanitation Conditions in the Working and Living Environments of Migrant Farmworkers

Site: Albany Hyatt House
1375 Washington Avenue
Albany, New York

Dates: October 5 - 10, 1975

InterAmerica Research Associates, under contract to the Bureau of Community Health Services, Migrant Health Division, will be conducting a five day training conference for selected migrant (310) health project personnel: in the states of Connecticut and Massachusetts in Region I; in the states of New Jersey and New York in Region II; and in the states of Pennsylvania, Delaware, and Virginia in Region III. InterAmerica has tentatively selected the Albany Hyatt House in Albany, New York, as the training site. InterAmerica will mail each project a conference package identifying all logistical and cost information concerning the training conference fifteen days prior to the day of the conference. Anyone desiring additional information about the conference, please contact Carlos Besinaiz, Project Director at (202) 333-4900 in Washington, DC.

The purpose of this course is to train selected migrant health project personnel in the recognition and identification of adverse sanitary conditions related to the migrant farmworkers living and working environments, and to outline approaches for the presentation and alleviation of health hazards through the referral of recognized sanitary deficiencies and code violations to responsible regulatory agencies having jurisdiction over the working and living environments of migrant farmworkers.

The specific objectives of this training will be to ensure that migrant health project personnel:

a. understand the basic health problems of migrant farmworkers as a result of their working and living environments;

b. recognize potential or existing health hazards within the working and living environments of migrant farmworkers;

c. identify violations of regulations, codes, and standards that govern the health-sanitation conditions of the migrants working and living environments; and,

d. refer violations to the appropriate enforcement agency having jurisdiction over the living and working environment of the migrant farmworker.

Key content areas will include:

a. Epidemiology of Migrant Health

b. Sanitation Factors Affecting Migrant Health and Characteristics

c. Minimum Legal Sanitation Standards and Enforcement Procedures and Referral Procedures to Regulatory Agencies

*SUNDAY

Time	Activity	Location
4:00 - 7:00pm	Registration (InterAmerica staff)	Reception Area
8:00 - 8:20pm	Welcome Participants to Training Conference (Speakers: Carlos Besinaiz & Paul Agnano)	General Conference Room
8:20 - 8:25pm	Introduction of Staff and Resource Consultants (Speaker: Carlos Besinaiz)	General Conference Room
8:25 - 8:35pm	Training Conference Purpose & Objectives (Speaker: Paul Agnano)	General Conference Room
8;35 - 8:45pm	Introduction of Training Conference Agenda (Speaker: Carlos Besinaiz)	General Conference Room
8:45 - 8:55pm	Explanation of Logistical Arrangements for Training Conference (Speaker: Carlos Besinaiz)	General Conference Room
8:55 - 9:55pm	Assessment Session (Group Leaders:	Rooms 1, 2 & 3

*MONDAY

Time	Activity	Location
8:00 - 9:00am	Small Group Sessions to Brief on Presentations A, B & C (Group Leaders:	Rooms 1, 2 & 3
9:00 - 10:00am	Migrant Health - Presentation A (Speaker: Dr. Richard Beck, [redacted])	General Conference Room
10:00 - 10:15am	Break	
10:15 - 12:00noon	The Epidemiology of Migrant Health - Presentation B (Speaker: Dr. Richard Beck)	General Conference Room
12:00 - 1:30pm	Lunch	
1:30 - 3:00pm	The Role of the Migrant Health Project in Migrant Health - Presentation C (Speaker: Dr. Richard Beck, [redacted])	General Conference Room
3:00 - 3:15pm	Break	
3:15 - 5:30pm	Small Group Sessions to Debrief on Presentations A, B & C (Group Leaders:	Rooms 1, 2 & 3
6:00 - 8:00pm	Dinner	

*TUESDAY

Time	Activity	Location
8:00 - 9:00am	Small Group Sessions to Brief on Presentations D, E, F & G (Group Leaders:	Rooms 1, 2 & 3
9:00 - 10:00am	The Role of the Health Aide in Surveillance of Health Hazards in the Living and Working Environments of Migrant Farmworkers (Part I) - Presentation D (Speaker: Dr. Richard Beck, [redacted])	General Conference Room
10:00 - 10:15am	Break	
10:15 - 11:00am	Sanitation Factors in the Working and Living Environment of Migrant Farmworkers (Introduction) - Presentation E (Speaker: Richard F. Clapp)	General Conference Room
11:00 - 12:00noon	Housing Sanitation - Presentation F (Speaker: Richard F. Clapp)	General Conference Room
12:00 - 1:30pm	Lunch	
1:30 - 2:30pm	Continue Housing Sanitation Presentation F	General Conference Room
2:30 - 3:15pm	Food Sanitation - Presentation G (Speaker: Richard F. Clapp)	General Conference Room
3:15 - 3:30pm	Break	
3:30 - 5:00pm	Continue Food Sanitation - Presentation G	General Conference Room
5:00 - 7:30pm	Dinner	
7:30 - 9:30pm	Small Group Sessions to Debrief on Presentations D, E, F & G (Group Leaders:	General Conference Room

*WEDNESDAY

Time	Activity	Location
8:00 - 9:00am	Small Group Sessions to Brief on Presentations H, I & J (Group Leaders:	Rooms 1, 2 & 3
9:00 - 10:00am	Water Sanitation - Presentation H (Speaker: Gilbert L. Kelso)	General Conference Room
10:00 - 10:15	Break	
10:15 - 12:00noon	Continue Water Sanitation - Presentation H	General Conference Room
12:00 - 1:30pm	Lunch	
1:30 - 3:15pm	Sewage Sanitation - Presentation I (Speaker: Gilbert L. Kelso)	General Conference Room
3:15 - 3:30pm	Break	
3:30 - 5:00pm	Solid Waste Sanitation - Presentation J (Speaker: Gilbert L. Kelso)	General Conference Room
5:00 - 7:30pm	Dinner	
7:30 - 9:30pm	Small Group Sessions to Debrief on Presentations H, I & J (Group Leaders:	Rooms 1, 2 & 3

*THURSDAY

Time	Activity	Location
8:00 - 9:00am	Small Group Sessions to Brief on Presentations K, L, M & N (Group Leaders:	Rooms 1, 2 & 3
9:00 - 10:00am	Disease & Vector Control - Presentation K (Speaker: Eldon P. Savage, Ph.D.)	General Conference Room
10:00 - 10:15am	Break	
10:15 - 11:00am	Continue Disease & Vector Control - Presentation K	General Conference Room
11:00 - 12:00noon	Pesticides Use and Accident Prevention - Presentation L (Speaker: Eldon P. Savage, Ph.D.)	General Conference Room
12:00 - 1:30pm	Lunch	
1:30 - 3:00pm	Continue Pesticides Use and Accident Prevention - Presentation L	General Conference Room
3:00 - 3:15pm	Break	
3:15 - 5:00pm	The Law and Code Regulations Applicable to the Living and Working Environments of Migrant Farmworkers - Presentation M (Speaker: Migrant Action Legal Program Attorney)	General Conference Room
5:00 - 7:30pm	Dinner	
7:30 - 9:30pm	Small Group Sessions to Debrief on Presentations K & L (Group Leaders:	Rooms 1, 2 & 3

*FRIDAY

Time	Activity	Location
8:00 - 9:00 a.m.	Small Group Sessions to Brief on Presentations M & D	Rooms 1, 2 & 3
9:00 - 10:00 a.m.	Continue the Law and Code Regulations - Presentation M	General Conference Room
10:00 - 10:15 a.m.	Break	
10:15 - 12:00 noon	Panel Presentation - County and State Health Department Representatives, Federal OSHA Representatives, and MALP Representatives	General Conference Room
12:00 - 1:30 p.m.	Lunch - Presentation by Ohio Camp Aide Program Representative	
1:30 - 3:00 p.m.	Continue Part 2 of the Role of the Health Aide in surveillance of Health Hazards in the Living and Working Environments of Migrant Farmworkers - Presentation D (Speaker: Migrant Action Legal Program Attorney)	General Conference Room
3:00 - 3:15 p.m.	Break	
3:15 - 3:45 p.m.	Evaluation of Training Course - Small Group Sessions	Rooms 1, 2 & 3
3:45 - 4:30 p.m.	Closing Session - General Comments and Presentation of Certificates	General Conference Room

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COURSE OBJECTIVES

Our objectives for this course are to help you:

(a) better understand the basic health problems of migrant farmworkers as a result of their working and living conditions;

(b) be able to recognize potential or existing health hazards within the working and living environments of migrant farmworkers;

(c) know how to identify violations of regulations, codes, and standards that govern the health sanitation conditions of the migrants' living and working environments; and

(d) know how to refer to the appropriate enforcement agency having jurisdiction over the living and working environments of the migrant farmworkers.

In meeting these objectives, we will cover the following key content areas:

(a) Epidemiology of Migrant Health

(b) Sanitation Factors Affecting Migrant Health and Their Characteristics

(c) Minimum Level Sanitation Standards and Enforcement Procedures

THIS RESOURCE MANUAL AND YOU

You are now participating, or about to begin participating in a Five Day Training Course for Migrant Health Project Personnel. This manual is designed to help you help others more effectively as a migrant health project staff person. It is intended as a personal resource manual for you to adjust to your own personal style and experience. Use it, write in it, talk about it, add new material to it.

The central theme flowing through this manual has already been characterized in the welcome letter: that migrant health personnel should be involved in the surveillance of health hazards of sanitation conditions in the working and living conditions of migrant farmworkers. I want to take a few paragraphs right now to involve you and to briefly explain how the manual relates to this training conference, how it is divided, and how you can use this manual after you leave.

We have categorized content areas in a sequence that promotes developmental understanding of knowledge, concepts, and skills, and that relates specific content areas to other content areas. Our intent is to provide an integrated learning experience which develops all required concepts and skills of Sanitation Health Hazard Surveillance throughout the training period.

Training and the Resource Manual

The sequence in which the Resource Manual material is presented corresponds to the sequence of the different training presentations. For example, this entire Section I - Introduction corresponds to the

first evening's welcoming and introductory activities, and Section II - The ABCs of Migrant Health is reading and reference material for training activities on the first day and a half of the actual training.

The manual is divided into the following five section:

Section I - Introduction
Section II - ABCs of Migrant Health
Section III - Sanitation Factors
Section IV - Pesticides
Section V - Law and Code Regulations

Section I - Introduction

Section I provides general information about this five day conference and answers questions you may have concerning your stay with us, what you will be doing, what time and where certain activities will be taking place. In short, Section I provides you the major points of the Orientation Session.

Section II - ABCs of Migrant Health

The following section, Section II - The ABCs of Migrant Health, has reading and reference material on the complex and interrelated factors of migrant health and of migrant health epidemiology. These materials present an overview of migrant health, an in-depth look at the epidemiology on migrant health, and a common base of information from which will be defined the role of the migrant health project and health aide in the surveillance of health hazards in the working and living environments of migrant farmworkers.

Section III - Sanitation Factors

Section III - Sanitation Factors, is the largest section in your manual. You will notice that Section III is divided into different colored subsections. This is done for easier reference. There are seven distinct subjects covered in this section, what are:

* Overall relation of sanitation factors to the epidemiology of migrant health
* Housing sanitation factors
* Food sanitation factors
* Water sanitation factors
* Sewage sanitation
* Solid waste sanitation
* Disease vestor control

These subjects correspond to presentations on the second, third, and fourth days of training. The first part of this section will assist you in defining environmental sanitation factors as they relate to the epidemiology of migrant health. The second part of Section III, Housing Sanitation, provides you with the script of the slide presentation you will see on the second day. The script will enable you to refresh your memory, and review the basic principles of healthful housing when you have returned to your parent organization. Food sanitation, the subject of the next part, provides you with a summation of the sanitation principles applicable to food and food preparation. Entitled Basic Factors in Food Hygiene, this part covers operational procedures, physical facilities, and what you can do about the size and nature of the foodborne disease problem. This material can be very helpful as a guide to inspection of a food facility.

The next part, Water Supply Sanitation, begins with the premise that a proper water supply that will not cause the person using it to become sick is necessary for life. Within this part the sources of such a supply are explored, the different means of protecting the water supply after it leaves the well or distribution system are discussed, and last, but equally important, different methods of emergency disinfection whenever there is doubt about the safety of the water.

Sewage Sanitation, the next part, provides you with a capsule summary of the sanitation principles applicable to sewage systems as a contributing health hazard factor. The subject matter is covered in two parts: the importance of proper sewage sanitation, and the functions of a sewage sanitation system that is condusive to a healthful environment.

Solid waste, refuse, garbage, and rubbish as contributing health hazard factors are covered in the following part, Solid Waste Sanitation. Methods of solid waste collection and disposal are detailed as well as what to look for when checking solid waste sanitation.

Carriers (vectors) of disease are covered in the part of this section. This includes cockroaches, lice, true bugs, flies, mosquitos, gnats, fleas, ants, bees, and wasps as well as spiders, ticks, and mites. Breeding grounds and means of control are discussed in this part.

Section IV - Pesticides

Farmwork has been called the third most dangerous profession in the United States. One of many factors making farmwork dangerous is exposure to pesticides. If the potential hazards of these poisons are

not recognized, serious difficulties can result; however, most accidents with pesticides can be prevented. Pesticides, their use, and accident prevention are covered in two parts in this section.

One section is an Informational Booklet on Pesticides, prepared by the Migrant Legal Action Program, which covers the issue in depth. The second part details an outline on pesticides. Both parts in this section will prove very useful resources for both you and your fellow migrant health workers.

Section V - The Law and Code Regulations

The Occupational Safety and Health Act (OSHA), enacted to protect the safety and health of workers, unlike other legislation applies to all farmworkers. OSHA is the topic covered in this section.

This section could well be a model to protect the occupational safety and health of farmworkers. It focuses on standards and enforcement, and should be required reading for all migrant health workers.

We hope that through this manual, you will gain some information through which you will be able to improve your effectiveness as a migrant health project staff person. But, just reading the information won't help you use the information in the field. The best way for you to learn how to use this information would be to talk about it, raise questions about it, and discuss ways of applying it to your parent organization. Use this manual as training reading resource material and you will maximize the learning you gain from this session.

When you return to your respective organizations, you will find many opportunities to test your understanding of Surveillance of Health Hazards of Sanitation Conditions in the Working and Living Environments of Migrant Farmworkers. Use it as a resource and a reference for your migrant health project along with the other resources and experiences that are available for you to draw upon. If if contributes toward this end, that will meet some of our hidden objectives for writing it.

EPIDEMIOLOGY AND DISEASE

Richard H. Beck, D.O., M.P.H.

It is my purpose in this talk to review for you some of the underlying knowledge regarding epidemiology and disease. Epidemiology is defined as the science of epidemics and epidemic diseases. An epidemic could be defined as the extensive prevalence (existence) in a community of a disease brought from without, or a temporary increase in the number of cases of an endemic disease. An endemic disease is a disease which has a low incidence but which is constantly present in a given community. The most important concern of epidemiology is the discovery of factors essential or contributory to the occurrence of any particular disease. However, it should be pointed out that epidemiology is not a well-defined body of knowledge such as chemistry. It is more a discipline which has evolved relatively specialized methods for investigation of disease causation. With some justice it has been called a method rather than an independent science. The epidemiologic unit functions like the detective bureau in the police force. A statistical association is sought when studying events to attempt to establish any cause and effect relationship.

Disease which will be discussed first is only one cause of ill health. Ill health can also be due to accidental trauma or poisoning.

There are two kinds of diseases, infectious disease and noninfectious disease. Infectious disease is caused by something from outside the body that enters or gets on the body of a susceptible person. We have all experienced an infectious disease of one sort or another due to a bacteria or virus. Prior to the discovery of antibiotics less than forty years ago, infectious diseases were the number one killers.

The second type of disease, noninfectious disease, may be inherited (e.g., diabetes), develop over time (e.g., cancer), or be acquired (e.g., pulmonary emphysema). In our affluent society the noninfectious diseases, namely, heart,

cancer, and stroke, are presently the number one killers.

Because of the socioeconomic conditions and "lifestyles" the infectious diseases still remain a threat to the migrant and seasonal farmworkers. As health workers it is important to understand the processes involved. In infectious diseases there are three major factors that are involved in the development of illness, namely, the agent, the host, and the environment. There is an interaction between these three factors. The agent is the immediate cause of a disease process. Germs, a common term, is an example of an agent. The host is the person who gets the disease from the agent. The environment encompasses all the surroundings in which the individual finds himself. This includes all the physical, social and psychological factors. An illustration of the interaction between these three factors - agent, host, environment - would be an iceberg, a ship and the sea.

In this representation the iceberg is the agent which can cause damage to the host, the ship, if they contact each other. The environment, the air and the water, are the factors that either bring them together or keep them apart. How could we prevent the agent from damaging the host? We could blow up the iceberg to get rid of it. In disease prevention, when we boil water before use, cook food, sterilize equipment, or put chlorine in water, we are attempting to kill the agent in order to prevent disease. In the illustration with the ship we could make the ship out of metal, or strengthen it so that a collision would not damage it. In disease prevention we immunize people against measles, polio, diphtheria, or other diseases to make man strong enough to not get disease from the agent even if he comes in contact with it. Again in the illustration, if we could change the air currents or the water currents we could prevent the agent and host from coming in contact. In disease prevention when we eliminate standing water to control

mosquito breeding, when we protect water supplies, or provide for the safe disposal of sewage, we are preventing the agent from contacting the host through environmental control.

During this course we will be discussing in much more detail how the environment relates to disease transmission and accident causation. We will be talking about specific kinds of hazards that need to be watched that can allow the agent and the host to come into contact and cause disease. We will be talking about how to recognize these hazards and how to prevent or eliminate them. But as an introduction, we need to be familiar with how the environment is involved for specific kinds of diseases - first infectious diseases. The exact role that the environment plays in noninfectious diseases is not clear at this time, therefore there is not as much attempt at controlling these kinds of diseases throught the environment. For infectious disease there are clear environmental factors. So let's look first at how infectious diseases can be transmitted. There are three basic patterns. (Figure]).

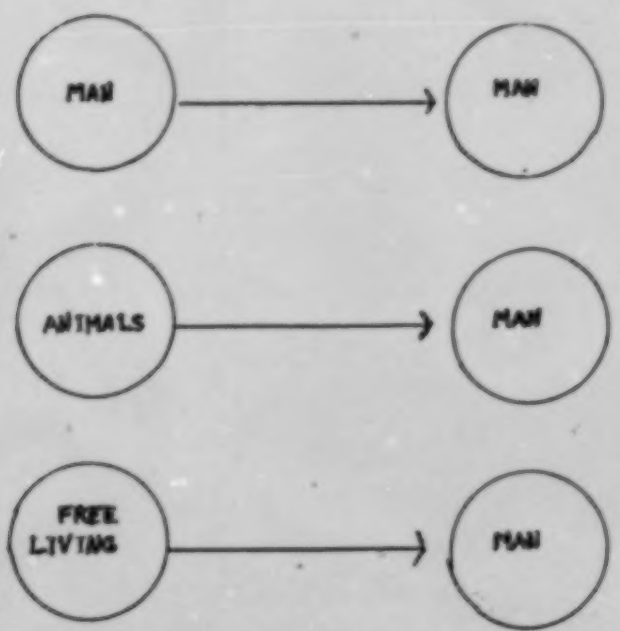

FIGURE 1

Some diseases are caused by agents that live only in man and therefore are transmitted only by man to man. Other diseases are caused by agents that normally live in animals but are sometimes transmitted from animals to man. Other diseases are caused by agents that live free in nature, in neither man nor animals, but can be transmitted from nature to man and are called free living agents. It should be pointed out, however, that some diseases may take more than one route of disease transmission. In a little while we will discuss some of these.

It is also possible for diseases to be transmitted from man to man, from animal to man, and from free living to man in more than one way. We will first look at the ways that diseases can be transmitted from man to man and cite some examples, paying particular attention to the environmental aspects of the transmission. We will then look at how man attempts to control the spread of these diseases through environmental factors.

FIGURE 2

The first example is man to man through direct contact. (Figure 2). A good example of this is syphilis which is transmitted from man to man through direct skin to skin contact. Here the agent (a germ) is in a sore on the infected person and when the skin of another person comes in contact the germ transfers by penetrating the skin of the host and then causes him to get sick. In this first example there is not a great deal of environmental factor involved. Therefore, there are not a lot of environmental controls that can be used against syphilis. The only ones that come to mind are physical barriers and quarantine of infected persons to physically separate them from persons

susceptible.

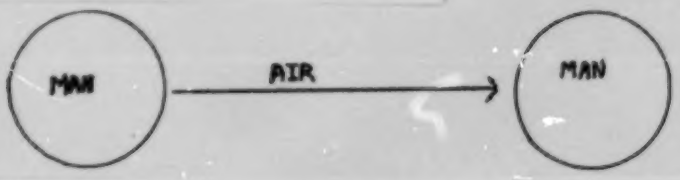

FIGURE 3

Another method of transmission is man to man through air. (Figure 3). A good example of this mode of transmission is Tuberculosis. Tuberculosis is a disease of the lungs. When a person who has this disease coughs he can expell the germs which cause tuberculosis into the air where they will stay suspended for a short period of time. If the air in which they are suspended is breathed in by another person, he may develop tuberculosis. The environmental methods for control of tuberculosis are quarantine of infected patients and eliminating overcrowding.

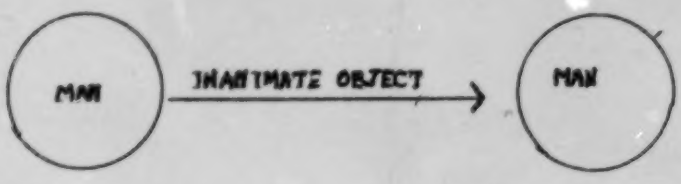

FIGURE 4

Still another method of transmission is man to man through an inanimate object - an object that is not alive. (Figure 4). A good example of this mode of transmission is hookworm. Hookworm is a small worm which lives in the guts of the sick person. This worm lays eggs which come out in the bowel movements of the infected person. If these infected feces fall on the ground, then the eggs hatch and small worms will live in the soil for a while. If another person walks on this ground barefooted, the small worms penetrate his feet, get into his bloodstream, and go to his guts to infect him. There are several environmental factors involved in the transmission of hookworm, but the main effort for control of this disease is through the sanitary and safe disposal of human wastes, and through encouraging people to wear shoes.

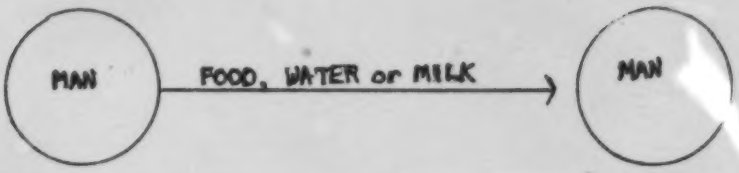

FIGURE 5

This next mode of transmission from man to man is oftentimes referred to as the fecal-oral route because it most often involves infected feces from a sick person that finds its way into food, water, or milk. (Figure 5). A good example is typhoid fever, where an infected person discharges the agent that causes typhoid in his bowel movements. Then, either through hands that are not washed after a bowel movement, or through direct or indirect routes, the infected bowel movement gets into food, water, or milk. It often involves insanitary disposal of human wastes or unprotected water supplies. Here the environmental aspects of transmission are great and the controls through environmental factors are multiple. Some are: sanitary disposal of human wastes, protection of water sources and distribution systems, proper handling of food, proper cooking of food, etc.

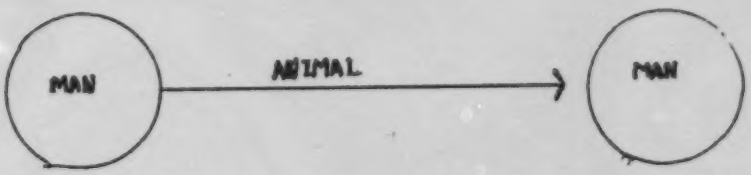

FIGURE 6

Another mode of transmission is man to man with an animal involved in the transmission. (Figure 6). This is not like the disease being a disease of animals that man gets from animals (which we will discuss shortly) but the animal is a means by which the transmission from man to man occurs. An example is a tape worm, which lives in the gut of man. This worm produces eggs which are discharged in bowel movements. If these eggs get on animal feed or grass which animals eat and is eaten by the animal, then the eggs hatch inside the animal, get into the animal's bloodstream and are distributed about the animal's body in the meat. When the animal is eaten by man and the meat

is not cooked enough to kill these infective agents, then they get into the gut of the person and develop into a tape worm, which produces eggs and starts the cycle all over again. Here there are quite a few environmental factors and therefore several means of environmental control. The include: the sanitary disposal of human wastes, protection of animal feeds, inspection of animal slaughter houses, and proper cooking of meat.

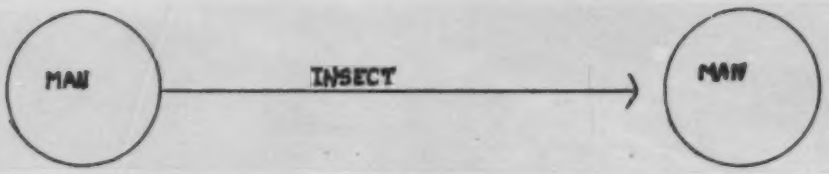

FIGURE 7

Another mode of transmission is similar to the animal mode described above, except that it is an insect that transmits the disease instead of an animal. (Figure 7). A good example is malaria. In malaria an infected person has the malaria germs in his blood. A mosquito bites this person and sucks his blood, taking in some of the germs of malaria. These germs develop inside the body of the mosquito. Then later the mosquito bites another person and injects some of the malaria germs into the bloodstream of the new person. They then produce malaria in the new person. There are quite a few environmental factors in the transmission of malaria and quite a few environmental controls, which include: elimination of standing water which breeds mosquitoes, covering any water with oil to stop breeding, killing adult mosquitoes with insecticides, quarantine of malaria carriers, and screening of buildings to keep mosquitoes out.

We have discussed the ways that diseases can be transmitted from man to man. Now let's look at some of the ways that diseases can be transmitted from animals to man.

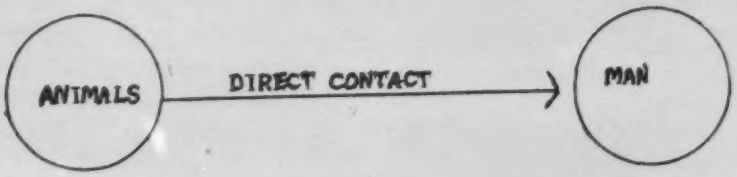

FIGURE 8

First, direct contact, which means just what it says. A good example is rabies. In this case it is a disease of animals that is spread from animal to animal by bites. The germs of the disease are in the saliva of the animal and when another animal is bitten, or when man is bitten, the germs are injected into the body of the animal or person bitten. They then produce the disease, which is almost totally fatal. Here the animals themselves are part of the environment and are controllable through vaccination of pets against rabies, control over the number of dogs and leash laws to keep them from roaming at will, and control over wild animals which can carry the disease and include foxes, bats, etc.

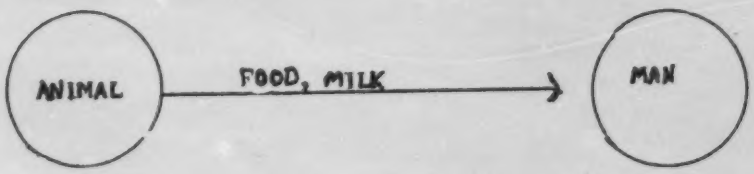

FIGURE 9

In the next case animal products are used for food. (Figure 9). If the animal is infected with an animal disease (not like the animal is transmitting the disease from man to man) and man eats animal meat or drinks the milk, then the germs of the disease makes man sick. A good example is trichinosis, which is a little worm that gets into the muscle of the animal. When man eats the animal the worm matures, produces more worms and they get into the muscles of man. Here the environmental factors that can be controlled that contribute to transmission are cooking or prohibiting the use of garbage as animal feeds (because uncooked garbage may contain raw meat with the germ which may infect other animals), meat inspection at slaughter houses, and adequate cooking of meat before eating. Another example is brucellosis, which is a disease of

animals which can get into milk. If the milk is not pasteurized and man drinks the milk he ingests the germs and can get sick from brucellosis. Environmental control includes testing of animals to eliminate those with brucellosis from giving milk and pasteurization of milk.

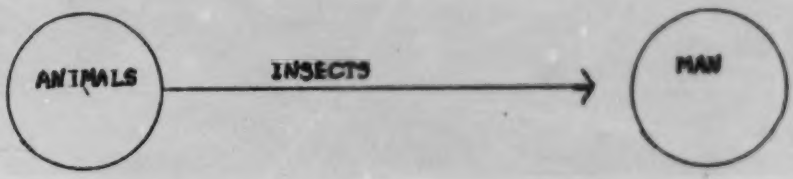

FIGURE 10

Thirdly, there are several diseases that can be transmitted from animals to man through an insect. A good example is encephalitis (sleeping sickness) which is a natural disease of birds and is transmitted from bird to bird by mosquitoes. But sometimes when there are lots of birds in an area and lots of mosquitoes and there is lots of the disease in birds, then a mosquito which has bitten an infected bird and has the germ in it bites man and the germ produces encephalitis in man. As in malaria discussed earlier, elimination of standing water to prevent mosquito breeding, putting oil on water to prevent mosquito breeding, killing adult mosquitoes, and screening are environmental controls used to stop the spread of the disease encephalitis.

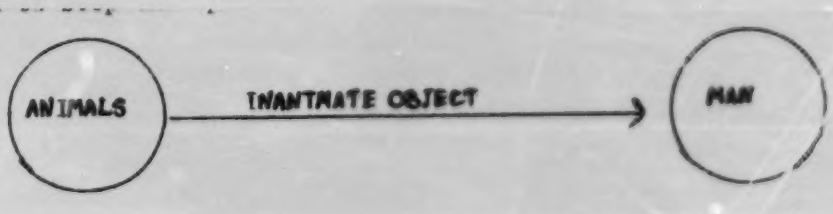

FIGURE 11

Lastly, diseases can also be transmitted from animals to man through inanimate objects, objects that are alive, but are part of the environment. A good example is tetanus (lock jaw). The germ that causes lock jaw is a normal inhabitant of the gut of horses (and other animals) and is released from the animal in bowel movements. These germs live for a long time in the outside environment and if they get on any sharp object (thorn, nail, etc.) which is stepped on or otherwise penetrates man's skin they are injected into man's

body. There they grow and produce lock jaw. Sterilizing any object that man intentionally pierces his skin with is about the only envirnomental control of this disease; also, wearing protective covering such as work boots.

The next broad category of transmission of diseases to man is from nature, the free living state, to man. As mentioned before these agents that cause disease are natural inhabitants of the world around us and many do not cause any harm as long as they are just inhabitants of the world around us and do not come in contact with man. When they do they cause disease. There are at least three ways that they can be transmitted from their free living state to man.

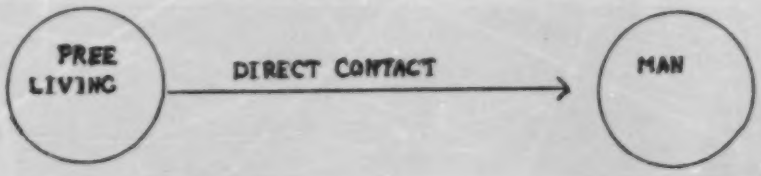

FIGURE 12

There are certain kinds of fungus which live in nature, particularly on plants, that get on the thorns of plants. When these thorns pierce the skin of man they can inject the fungus into man, where it grows and produces a disease. This is a direct contact, and except for wearing protective gloves or clothing, there are few environmentl controls. (Figure 12).

FIGURE 13

There are other kinds of fungus which live in the soils and cause no harm to man there. But when the soil is disturbed and stirred up it can cause dust to get into the air containing the fungus. If man breathes in this fungus it can grow in his lungs and cause disease. (Figure]3). Examples are farmer's lung, histoplasmosis, and coccidioidomycosis. Environmental control is to avoid disturbing the soil to cause dust in areas where this disease can occur

or wear protective masks if this can not be avoided.

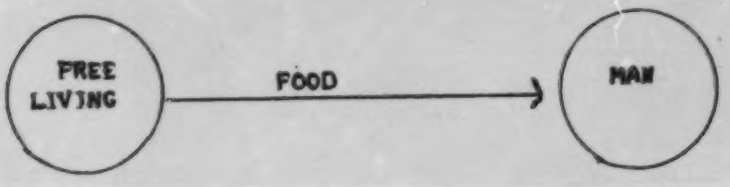

FIGURE 14

Another free living to man route is through food. (Figure 14). A good example is botulism, one type of food poisoning. The germ that causes botulism lives free in nature in the soil. If it gets into food which is canned but not cooked properly when canned it can grow inside the can and produce a poison which can kill people if they eat the canned food. Environmental controls are proper preparation of foods for canning, proper canning, and use of durable cans.

It was mentioned earlier that there are some diseases that can cause disease in man by using several of these routes. A good example is the disease hepatitis. The disease hepatitis can be transmitted in several ways. It can be transmitted directly from man to man when hands are not washed after a bowel movement. It can be carried by flies from privies to food. It can get into an unprotected water supply and into drinking water. It can get into food through unwashed hands. It can get into oysters where sewage is discharged into an area where oysters grow. It can also be transmitted from person to person through dirty needles, etc.

One of the responsibilities you will have while visiting in the migrant camps is to be on the alert for any suggestion of environmentally associated diseases. When an epidemic is suspected you should immediately notify the clinic director who then notifies the health department.

Usually, when larger than expected numbers of cases of a disease occur, there is a cause that has changed or occurred. When the disease is one that environmental factors greatly influence, that change may be environmental in

nature. Food may have been contaminated, for example, or a water supply may h ave become contaminated.

One of the standards for migrant labor camps which has been adopted by the Occupational Safety and Health Administration of the Department of Labor is that:

"It shall be the duty of the camp superintendent to report immediately to the local health officer the name and address of any individual in the camp known to have or suspected of having a communicable disease." And it follows saying, "Whenever there shall occur in any camp a case of suspected food poisoning or an unusual prevalence of any illness in which fever, diarrhea, sore throat, vomiting or jaundice is a prominent symptom, it shall be the duty o f the camp superintendent to report immediately the existence of the outbreak to the health authority - by telegram or telephone."

It is even more important to recognize these potential or existing health hazards which include violations of the camp regulations, codes and standards prior to the onset of any epidemic. You will go over these in detail in the latter talks.

Traumatic accidents

Accidents, including both injuries and poisonings, are a different kind of threat to man's health than disease. Accidents are an interaction between man and his environment. The environment contains all kinds of things, both animate (other men, other animals, etc.) and inanimate (trees, houses, water cars, etc.), that are of potential danger at all times.

Some of these things occur naturally (trees, streams, ponds, rocks, gulleys, etc.) while some of them are manmade (cars, roads, houses, steps, poisons, pesticides, etc.) Also there are hybrids between these two categories when man plants a tree in a specific location. Trees are natural, but the potentially

hazardous location of the tree is manmade.

Normally, man can avoid any- confrontation with these things that can hurt him. However, sometimes certain circumstances can cause a situation where a confrontation between man and a hazardous environmental situation occurs. (These circumstances include darkness, preoccupation of man, a recent rain or snow storm, a change of habit or procedure, an inquiring child, haste, etc.). Farm work is hazardous work.

This confrontation between man and the hazard can have three possible outcomes:

(1) man in not injured, e.g., he falls down but is not hurt,

(2) man is injured, e.g., he falls down and breaks a leg (and the injury can range from very slight - a scrape or bruise - to very serious - complete paralysis) or

(3) man is killed.

The first goal of accident prevention should be to see that no confrontation occurs, so that neither of these three possible outcomes comes about. However, this may not always be possible, so sometimes we try to limit the consequences of an accident. For instance, we put seat belts in cars, not to prevent accidents, but to prevent people from getting killed or hurt seriously in automobile accidents. We design roads, put up stop signs, stop lights, and paint "no passing" lines on highways to prevent accidents.

There is a popular misconception that accidents are unpredicted or unpredictable. This simply is not usually the case. There are, of course, a few, very few, accidents whose potential for happening could not be foreseen enough to be predicted or prevented. For the most part their potential can be foreseen and they can be prevented by working through the following factors, many of which are environmental:

(1) people's attitudes

(2) people's habits

(3) people's knowledge

(4) people's behavior

(5) changing natural environmental hazards

(6) putting up barriers between man and hazards that are not easily changed

(7) building in safeguards in manmade things being built

(8) changing existing manmade hazards

This discussion is intended to show how the environment is a factor in accidents as well as in disease occurrence.

MIGRANT HEALTH PROBLEMS

As an introduction I would like to quote from an introduction from a paper entitled "Migrants in Florida", July 1975:

"The situations and programs encountered by migrant farm workers in Florida are similar to the situations and programs encountered in the other home-base states of Texas and California.

In a study conducted by the University of Miami, migrant farm labor in Palm Beach county was analyzed.

The 1968-69 study re-emphasized the migrant situation. The following is an abstract of the study:

> Primarily migrant farm workers were employed in harvesting of vegetables, citrus and flowers. The life expectancy of a migrant was 49 years as opposed the average life expectancy age of 62 years; (at the time the study was taken).
>
> The housing provisions for migrants were considered inadequate. Housing conditions affected the migrant's health, not only physical but also emotional. Structural defects in housing caused accidents. Overcrowding resulted in emotional problems. Also, overcrowding and poor sanitation and water facilities encouraged the spread of communicable disease.
>
> The migrant farm workers were found to be in poor health. They had poor diets and were eating, in some cases, food that was spoiled. This was attributed to lack of income, and lack of kitchen facilities both for cooking and storage.

Unfortunately, the migrant situation has changed little in Florida."

In this talk I would like to go into some of the situations just mentioned. First, I think that it should be pointed out that in preparation for this talk, I reviewed the medical literature for the past five years using the cumulative

medical index which would contain all the medical articles on migrant health and disease. There have only been seven articles published. As you will see we are talking about a group of people with the poorest health in the country. Yet only seven articles. This makes me think that either there is not much interest in migrant health or there has not been much progress during this time, probably both.

The conditions as outlined in the article and as we see them on a working basis can be primarily attributed to poverty. There are many similarities between migrant problems and black inner city problems. Studies have demonstrated that the income levels are below the poverty line for most migrants due to the hourly wage and the limited number of days they are able to find work. There are additional problems in migrant health. First there is the cultural-language difference. Secondly there is the mobility factor. This produces a problem of both access and continuity of medical care. It also prevents them from being eligible for most state aid programs.

Let's look at some facts about the nutritional status of preschool Mexican American migrant children. Three hundred preschool children were studied.[1] The four principle findings were:

(1) infant mortality by history was 63 deaths per 1,000 live births (20/1,000 U.S. overall)

(2) 55% were found to have vitamin A deficiency

(3) 36% showed evidence of reduced food (caloric) intake

(4) other findings were decreased height attainment, decreased weight, decreased head circumference, liver enlargement and a decreased serum protein.

I think that it is safe to conclude from this you will be seeing nutritional problems of both inadequate types of food and inadequate amounts of food. The

agricultural department has a program for pregnant women, lactating women and newborns which will provide them with additional food supplies. In our area we enroll as many as possible.

A second interesting problem is that of lead poisoning. This is a common pediatric problem caused primarily by the ingestion of lead-based paint chips by children of toddler age. Much has been written about this in inner city children. Dr. Osband[2] from the Albert Einstein College of Medicine studied migrant camps in Upstate New York housing 4,000-6,000 migrants, half of whom maintained private homes in Florida. He found that 98.3% of the camps studied were positive for lead-based paint. He concluded that all children living in such housing should be recognized as having been subjected to lead exposure. When lead gets into the body it can make you very sick, and disrupts the function of the peripheral nerves.

I found another paper on migrant children by Dr. Gilbert[3] from Contra Costa County, California. He cited the following facts:

"1. Perinatal mortality in California for 1968 (the last year ethnic occupational data are available) was 28.3 for Spanish farm workers versus 19.0 for white professional, administrative and technical workers - a 50% excess.

2. Of 776 women interviewed in a 1969 health survey in rural Contra Costa County (a predominantly farm worker community about 50 miles from San Francisco), 13% reported an infant death.

3. A review of postnatal deaths due to diarrhea (a category chosen because of presumed preventability) showed that farm worker children had seven times the expected mortality.

4. A hematological survey of rural, predominantly farm worker children showed that almost all between the ages of 6 and 25 months were anemic,

half the 4 to 8-year-olds had some degree of anemia, and over 80% were iron-depleted.

All the sociological factors would play a part in these statistics but these especially highlight the lack of medical care during pregnancy and well-baby care during the first year of life and proper nutrition. In addition, it should be pointed out that dental caries are common to nearly the entire population. Dental extractions constitute 25% of all their dental services.

The last article that I would like to cite deals with the epidemiology of a contagious disease, namely, typhoid. This occurred two and a half years ago in South Dade Florida. It was published by Dr. R.E. Feldman and others in the Journal of Infectious Diseases[4]. I would like to quote their summary:

"In February and March 1973, 225 cases of probable or confirmed salmonella typhi infection occurred at the South Dade Migrant Farm Labor Camp, Dade County, Florida. Five other cases occurred outside the camp. At least 184 patients were hospitalized. There were no deaths. This was the largest reported outbreak of typhoid fever in the United States since 1939. A mentally retarded girl at the camp developed typhoid fever in January and was probably the index case; a possible source of her infection was a suspected carrier living next door. Epidemiologic investigation suggested a common source and implicated the water supply at the camp as the mode of transmission. Engineering evaluation revealed substantial flaws in the design and construction of the camp's wells, chlorinator, and sewerage system, which were subsequently corrected. The outbreak subsided with few secondary cases and no transmission to persons unconnected with the camp, and without resort to quarantine or mass immunization against S. typhi."

The immediate offshoot was that the source of water, namely a camp well, was closed down and commercial water was piped into the camp. A complete

environmental study was done following the epidemic and recommendations were made. One year later the study was repeated (1974) and as you might have guessed none of the recommendations had been implemented. A list of "impediments to progress" was drawn up and I thought it might be interesting to look at.

1. Migrants, Agricultural Workers, Low-Income Groups

   Ethnic and cultural differences

   Low economic status

   Low educational levels

   Lateral disorganization

   Migratory lifestyles

2. Agricultural System (Growers, Crew Chiefs, Packers)

   Non-acceptance of responsibility for migrants' problems

   Non-recognition of migrants (Crew Chief system)

3. Community

   Exclusion of agri-workers from decision-making and implementation of community affairs

   Limited or vested interest in migrants' problems

   Lack of formal retraining, incentive-producing and assimilation programs

4. Landlords, Housing Management

   Housing quality maintained only to meet minimum licensing standards

   Indifference toward health status, aesthetic needs of migrants

   Lack of timely response to basic migrant needs

   Lack of communication with migrants

5. Politicians

   Promises

   Inaction

   No follow-up

6. Federal Bureaucracies

Token concern only

7. Local Public Enforcement Agencies

Money, manpower constraints

Fragmentation of environmental services between and within agencies

Lack of formal planning approach to environmental problems

Lack of interagency communications regarding common problems

Lack of communication with migrants (bilingual inspector?)

Lack of authority and legal support

Indifference to migrants' environment except at inspection time

Crisis orientation

8. Private non-profit Organizations

Money, manpower constraints

Lack of legal authority to demand change

Lack of environment management programs to coincide with delivery of health services

I use this as an example to show how complex the correction of a health hazard or hazards can be demonstrating the forces and some of the reasons that can be involved.

Next I would like to run down the list of diseases most frequently seen in our clinic and their percentages of the total diseases seen as reported off our computer for September. Although there are differences in codeing since our patients are migrants, seasonal farm workers, and the medically indigent in South Dade, this list I believe still should reflect the diseases you would see in any migrant center.

DISEASES	PERCENTAGES (%)
1. Well child	12.5
2. Undiagnosed illness	11.7
3. Hypertension	8.4
4. Colds	7.6
5. Cuts and trauma	7.0
6. Pregnancy (Prenatal)	6.5
7. Throat infection	6.5
8. Well patient exam	5.5
9. Diabetes mellitus	4.5
10. Skin rash	3.9
11. Urinary infection	3.6
12. Otitis media (acute)	3.5
13. Impetigo	3.1
14. Skin infection - other	2.6
15. Abdominal pain	2.6
16. Anxiety neurosis	2.6
17. Arthritis	2.5
18. Family planning	2.3
19. Tension headache	2.2
20. Cervicitis	2.1

Last winter we ran a trial program of clinics in the camps. The kinds of problems we saw in order of magnitude were:

1. Upper respiratory infection
2. Well child
3. Otitis media
4. Pregnancy (Prenatal)

5. Impetigo

6. Skin rash

In summary, the physical and mental health of the migrant and seasonal farm workers is considered by many to be the worst of any group in America.

Is it any wonder knowing the deprivations these people are subject to?

Does it come as a surprise that these conditions have remained practically unchanged over the last two or three decades?

The existence of this reality is the late 20th century is a national disgrace. As health providers we must contribute to their resolution by:

(1) first by creating an awareness of the problem

(2) second by developing an understanding of the problem

(3) thirdly by appreciating and accepting the cultural differences between Anglos and the Mexican American

(4) Finally by making a personal committment to working toward their solution

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4 Epidemiology of salmonella typhi infection in a migrant labor camp in South Dade Florida. Feldman, R.E., et al. J. Infect. Dis. 130(4):335-42, October, 1974.

Delivering health care to domestic farm workers. W.D. Campbell. Texas Med. 70:57-60, January, 1974.

THE ROLE OF THE HEALTH AIDE IN THE SURVEILLANCE OF HEALTH HAZARDS OF SANITATION CONDITIONS IN THE WORKING AND LIVING ENVIORNMENTS OF MIGRANT FARMWORKERS

Much has been written about the role of the migrant health aide within the context of the health project and this has included the surveillance of health hazards of sanitation conditions in the working and living conditions of migrant farmworkers. This paper has been prepared to present in a simmple format an outline of the health aide's role.

The health aide's role encompasses two principal tasks in ensuring that sanitation conditions in the working and living enviornment of farmworker's are conducive to good health. These two principal tasks are:

I. Information Gathering and Dissemination

II. Linkage Establishment Between Farmworkers and Enforcement Agencies and/or other Agencies

I. INFORMATION GATHERING AND DISSEMINATION

(a) From the farmworker

1. Name and address of camp occupancy and patients
2. Name and address of grower
3. Name and address of crew leader, and whether he is registered as required by law.

(b) Information to the farmworker

1. Available information about health services
2. Information available of Health Code Enforcement Agencies (county, state health departments, and OSHA)
3. Food Benifit programs
4. Unemployment Compensation (Special Unemployment Assistance)
5. Local legal services (where they are available)

II. LINKAGE ESTABLISHMENT BETWEEN FARMWORKER AND HEALTH CODE ENFORCEMENT AGENCIES AND/OR OTHER SERVICES

(a) County health and State Health Departments

(b) OSHA camp sanitation conditions

(c) Department of Labor (DOL)- Farm Labor Contractor Registration Act
Wage and Hour Employment Service

(d) Enviornmental Protection Agency (EPA) pesticide violations

(e) Legal services

A Five-Day Training Course for Migrant Health Project Personnel in the Surveillance of Health Hazards of Sanitation Conditions in the Working and Living Environments of Migrant Farmworkers

Module V: Housing Sanitation

Prepared by:
Richard F. Clapp

HOUSING

Fundamental objectives of healthful housing can be grouped into five categories:

1. PHYSICAL NEEDS (objectives to satisfy fundamental physiological needs).
2. MENTAL (EMOTIONAL) NEEDS (objectives to satisfy fundamental psychological needs).
3. SOCIAL NEEDS (objectives to satisfy fundamental socialogical needs).
4. PROTECTION AGAINST COMMUNICABLE AND INFECTIOUS DISEASES (objectives to protect against contagion).
5. PROTECTION AGAINST ACCIDENTS (objectives to protect against accidents).

LESSON OBJECTIVE: That the trainees recognize basic principles of healthful housing and how these principles relate to physical, mental and social needs of individuals and to protection against disease and accidents.

DEFINITION OF HOUSING (Slide #1)

Housing includes the living unit(s)(dwelling units) for man and his family, its immediate surroundings, and related services and facilities--the total being referred to as the "residential environment" or "camp." Each household or family should be entitled to a separate living unit.

RELATION OF HOUSING TO HEALTH

"It is self-evident...although frequently overlooked... I believe, that the quality of housing bears a distinct relation to the health of the people. However, it is extremely difficult to demonstrate the precise relationship between housing and health. Statistical techniques have not yet been found which can separate housing from all other social factors--economic status, education, nutrition, and so on--as it relates to health." (1949 statement by Dr. Leonard A. Scheele, then Surgeon General of the Public Health Service)

It is still very difficult to show exact relationships between housing and health. However, community studies that have been repeated frequently in different sections of the country over the past 20 years, give increasing support to the belief that health is related to the quality of housing.

One authority states..."quality of housing is an indicator of the occupant's health related behavior."

(Slide #2)

The city of Tucson, Arizona, for example, was divided into low, middle and high health strata based upon the census tract data of School Years Completed, Income, Crowding, and Condition of Housing.

(Slide #3)

If a coded map showing Condition of Housing is compared with the health stratification, it is seen that poor housing was located in the same areas as the low health strata. The same was true for crowding. Housing in the low health strata was more crowded.

If health data, incidence (number of cases) and rates (cases or deaths per 100,000 population), are placed over the health strata map, it is apparent that the health problems are greater in areas with the housing problems. In the Tucson study for example:

	Health Problem	Health Strata		
		Low	Middle	High
Slide #4	Tuberculosis - active cases per 100,000 pop., 1960-1964	67	21	10
Slide #5	Tuberculosis - deaths per 100,000 pop., 1959	16.7	12.6	4.4
	Tuberculosis - deaths per 100,000 pop., 1960	22.0	11.7	3.7
	Tuberculosis - deaths per	20.1	5.8	0
Slide #6	Hepatitis - spot map of number of cases, 1961-1963	-	-	-
Slide #7	Hepatitis - cases per 100,000 pop., June 1960 - August, 1963	143	77	62
Slide #8	Syphilis - spot map of cases of infectious syphilis, 1960-1964	-	-	-
Slide #9	Syphilis -infectious syphilis cases per 100,000 pop., 1961-1963	55.2	2.12	8.35
Slide 10	Infant Deaths - Spot map density, 1960-1963	-	-	-
Slide 11	Infant Deaths - deaths per 100,ooo live births, 1960-1963	36	19	14

A similar picture is presented in another study of Norwich, Connecticut, for the years 1963-1967. The low health strata (red) areas are the areas containing the greater number of housing problems as well as health problems.

	Health Problem 1963-1967	Health Strata		
		Low	Middle	High
Slide #13 Neuroses	Residents with neuroses admitted to Norwich Hospital, spot map	-	-	-
Slide #14 Neuroses Rates	Residents with neuroses admitted to Norwich Hospital, rate per 100,000	137.8	51.0	58.9
Slide #15 Psychoses	Residents with psychoses admitted to Norwich Hospital, spot map	-	-	-
Slide #16 Psychoses Rates	Residents with psychoses admitted to Norwich Hospital, rate per 100,000	147.7	52.9	37.1
Slide #17 Schizophrenic	Residents with schizophrenic reactions admitted to Norwich Hospital, spot map	-	-	-
Slide #18 Schizophrenic reaction Rates	Residents with schizophrenic reactions admitted to Norwich Hospital, rate per 100,000	125.9	42.2	30.6

A relationship between housing and health has been presented. The other factors related to health strata (income and education) are also concerns of the seasonal agricultural workers. The seasonal nature of employment tends to lower average annual incomes. Frequent moves from camp to camp make it difficult for children in the families to complete their school grades or for adults to participate in educational programs or vocational training.

The housing environment is the health status factor that is the subject of this lesson. A knowledge of the objectives and principles of healthful housing will help migrant health project personnel to bring about improvements in the housing environment at the camps. Deficiencies of the housing environment can better be related to health hazards and the health hazards can better be explained to seasonal workers living in the camps and others concerned. Minimum standards based upon the objectives and principles will be presented later in the course.

FUNDAMENTAL OBJECTIVES OF HEALTHFUL HOUSING

Fundamental Objectives of Healthful Housing can be grouped into five categories:

1. PHYSICAL NEEDS (objectives to satisfy fundamental physiological needs).
2. MENTAL (EMOTIONAL) NEEDS (objectives to satisfy fundamental psychological needs).
3. SOCIAL NEEDS (objectives to satisfy fundamental sociological needs).
4. PROTECTION AGAINST COMMUNICABLE AND INFECTIOUS DISEASES (objectives to protect against accidents).

BASIC HEALTH PRINCIPLES OF HOUSING AND ITS ENVIRONMENT

(Slide #20)

1. Provide shelter against the elements (rain, snow, wind, etc.). Shelter is provided by single family living units, multi family living units, multi family facilities, barracks type facilities,

etc. Buildings containing toilet, handwashing, laundry and bathing facilities provide shelter during their period's use, and also, buildings containing kitchens, dining halls, feeding facilities, offices and recreation facilities.

(Slide #21)

2. Provide heat to comfortable temperature in cold weather (68°F). Should apply to all buildings normally occupied during cold weather in camp areas (insulation, properly installed heating equipment).

3. Provide protection against too much heat in hot weather. Should apply to all buildings normally occupied during hot weather in the camps (insulation, shading, cross-ventilation, fans, coolers, air-conditioning).

(Slide #22)

4. Provide fresh air. Occupied buildings require ventilation to dilute cooking odors, tobacco smoke, body odors, etc. Camp housing should be located in areas where air pollution from industrial processing, waste burning, etc. will not be a problem.

(Slide #23)

5. Provide daylight to see in the daytime. Avoid glare. Adequate lighting is necessary for good health, safety and sanitation. Windows provide for indoor lighting in the daytime. Shades, awnings and sun screens can be used to control amount of sunlight and to prevent glare. Buildings should be spaced or located to prevent blocking out of daylight.

6. Provide artificial (electric) lights to see at night. Avoid glare. Adequate lighting is necessary for good health, safety and sanitation. Permanent lighting is installed in kitchens, baths, toilets, laundry rooms, etc. Movable lamps can be used to avoid glare for reading, sewing, etc. Outdoor lighting is needed in camp areas for safety and convenience.

7. Allow direct sunlight into the living unit. Promotes healthy mental attitudes of residents, especially persons confined to the house for continuous long periods (ill persons, infants, young children, housewives, etc.).

(Slide #24)

8. Prevent too much noise in the neighborhood. Avoid Housing in areas subject to noise pollution (areas close to heavily traveled highways, areas close to manufacturing operations, etc.). Locate living units so that the occupants will not be annoyed by noises from adjacent living units, utility buildings, community kitchens and dining halls, etc.

(Slide #25)

9. Provide space for the children to exercise and play. (Adults also need areas for recreation and relaxation.) Camps housing children could provide play yard similar to apartment complex yards. Day care centers for children usually have both indoor and outdoor play areas.

(Slide #26)

10. Provide privacy for the individual. Living units should be spaced so that activities of occupants do not prevent

occupants of adjacent units from sleeping, resting, reading, watching T.V., etc. Bedrooms should be separate from kitchen and dining and living rooms. Individual storage facilities (lockers or closets) for personal belongings should be provided for persons living in barracks type facilities.
Toilets and bathing facilities (other than those in individual family units) should be separate for men and for women. Booths around stools and showers provide additional privacy.

(Slide #27)

11. Provide opportunities for normal family life. Space, arrangement of space and facilities are the key factors. If the family will prepare meals and eat in the living unit, facilities and equipment for meal preparation, storage of food, dining and clean up are necessary. Some area for family gathering such as a combined dining and living room is needed. It is desirable that sleeping be arranged so that married couples, infants, and very young children are separate from young children, older, children, and single adults. Older children and single adults should have separate sleeping rooms for males and females.

(Slide #28, #29, #30, #31)

12. Provide opportunities for normal community life. Areas to receive visitors, access to church, health services, shopping, public transportation, recreation facilities, routine refuse collection are things that might be considered a part of normal community life.

(Slide #32)

13. Prove facilities which will allow household tasks to be accomplished without too much physical or mental tiredness. Inside plumbing, built-in sinks, stoves, washers, etc., space between beds and closets, and shelves for storage.

(Slide #33)

14. Provide facilities which will permit keeping the living unit and persons clean. These facilities include hot and cold water and sink within living unit if possible; bath or shower, washing machine or laundry tubs within or near the living unit; non-absorbant easily cleanable floors, walls, etc.

(Slide #34, #35, #36, #37, #38, #39)

15. Provide possibilities for aesthetic satisfaction (beauty and art) in the home and its surroundings. Clean up and paint within the camp site. Preserve trees and shrubs. Floor coverings, room colors, and curtains can add beauty to the living units.

(Slide #40, 41)

16. Fit in with the social standards of the local community. Larger camps may have established standards and serve as the local community. Increasing efforts are being directed toward welcoming camp residents to join in nearby community activities and share community resources.

(Slide #42)

17. Provide a safe, sanitary, acceptable tasting water supply, in adequate amount, and available to the living units. Safe drinking water will safeguard against illness. Adequate and available

amounts will promote cleanliness and good health (wells meet minimum requirements for construction, tests satisfactory, community water service used whenever possible.)

(Slide #43, #44)

18. Protect the water supply system against pollution in the living unit and throughout the camp. Prevent back siphonage or back flow (submerged inlets and hoses). Prevent contamination when carrying and holding buckets or water from hydrants and when filling and holding water coolers for field use.

(Slide #45)

19. Provide safe toilet facilities. These include privies or camp systems constructed and maintained according to regulations. Hook ups should be made to city sewers whenever possible.

20. Protect the interior surfaces of the living unit from sewage contamination. This also applies to utility and toilet facilities separate from the living unit (toilets to be kept clean and operating properly).

(Slide #47)

21. Avoid poor sanitation in the vicinity of the living unit. This applies to entire camp area. Proper refuse storage and collection is most important (metal containers with tight fitting lids, routine collection). Other problems include pooled wastes, abandoned autos, weeds, old lumber piles and junk.

(Slide #48)

22. Exclude vermin (flies, mosquitoes, roaches, bedbugs, rats, mice, etc.) from the living unit. Windows and doors can be screened and made tight fitting. Rat and mice holes can be blocked. In-

secticides, baits and traps can be used according to directions following safety precautions.

(Slide #49)

23. Provide facilities for safe food storage. This includes refrigeration for perishable foods, and shelves and containers for dry foods, etc.

(Slide #50)

24. Provide enough space in sleeping rooms to reduce danger of catching disease. Disease spread through the air or by close person-to-person contact are of concern under this principle.

(Slide #51, 52, 53, 54)

25. Construct buildings with materials and by methods to insure that they will be sound and safe from collapse. Construction design and materials should be of a quality to withstand all anticipated forces which affect structural stability (foundation and subsoil, wind, snowload, etc.).

(Slide #55)

26. Control conditions likely to cause fires or to cause the spread of fires. These controls include location of stoves and heaters, the use of proper fire resistant materials in construction, and safe electric wiring.

(Slide #56)

27. Provide for escape in case of fire. Two exits for each living unit are desired. Families may be encouraged to consider what emergency exits they could use in case of fire (doors, window openings, etc.).

(Slide #57)

28. Protect against electric shock or burns. Adequate wiring with a sufficient number of wall outlets to prevent overloaded circuit should be provided. Worn or frayed extension cords should be replaced. Electric drills, saws, cookers, etc., should be attached to 3-way grounded circuits if equipped with 3-way plugs. Proper size fuses should be used in all circuits and not replaced with coins or larger capacity fuses. Faulty or broken electric appliances should be repaired or discarded.

(Slide #58, #59, #60)

29. Protect against gas poisoning. Unvented fuel burning appliances, other than stoves, ranges and ovens should be prohibited. Space heaters, hot water heaters, and gas operated refrigerators must be vented to the outside, properly installed and maintained. Automatic gas fired equipment must shut off the gas supply when pilot lights go out. Residents should be alert for gas leaks and dangers of explosion.

(Slide #61, 62, 63, 64)

30. Protect against falls and similar injuries in the living unit and other camp buildings. Floors (covered or bare) and stairs should be smooth surfaced and in good repair. Halls, stairways and all floor areas need light (natural or artifical) when in use. Stairways require handrails. Nonslip wax should be used if floors are waxed. Windows should be 30 inches above the floor. Porches higher than 3 feet above ground need protective railings. Nonslip floors are desired for baths and showers. Removal or junk and orderly storage of personal belongings (toys, tools, etc.) will help prevent accidents.

(Slide #65, #66)

31. Provide facilities for safe and proper storage of drugs, insecticides, poisons, detergents, and other dangerous substances. These products must be kept inaccessible to small children at all times.

(Slide #67, #68)

32. Protect the neighborhood (camp living area) against danger of automobile traffic. Prevent through traffic in the camp. Provide convenient parking sites between the camp area and the roads.

(Slide #69)

33. Protect the neighborhood (camp living area) against flooding and standing pools of water. Proper location, drainage and grading will accomplish this purpose.

BASIC HEALTH PRINCIPLES OF HOUSING AND ITS ENVIRONMENT

1. Provide shelter against the elements (rain, snow, wind, etc.).
2. Provide heat to comfortable temperature in cold weather ($68^{o}F$).
3. Provide protection against too much heat in hot weather.
4. Provide fresh air.
5. Provide daylight to see in the daytime.
6. Provide artificial (electric) lights to see at night.
7. Allow direct sunlight into the living unit.
8. Prevent too much noise in the neighborhood.
9. Provide space for the children to exercise and play.
10. Provide privacy for the individual.
11. Provide opportunities for normal family life.
12. Provide opportunities for normal community life.

13. Provide facilities which will allow household tasks to be accomplished without too much physical or mental tiredness.
14. Provide facilities which will permit keeping the living unit and persons clean.
15. Provide possibilities for aesthetic satisfaction (beauty and art) in the home and its surroundings.
16. Fit in with the social standards of the local community.
17. Provide a safe, sanitary, acceptable tasting water supply, in adequate amount, and available to the living units.
18. Protect the water supply system against pollution in the living unit and throughout the camp.
19. Provide safe toilet facilities.
20. Protect the interior surfaces of the living unit from sewage contamination.
21. Avoid poor sanitation in the vicinity of the living unit.
22. Exclude vermin (flies, mosquitoes, roaches, bed bugs, rats, mice., etc.) from the living unit.
23. Provide enough space in sleeping rooms to reduce danger of catching disease.
24. Provide facilities for safe food storage.
25. Construct buildings with materials and by methods to insure that they will be sound and safe from collapse.
26. Control conditions likely to cause fires or to cause the spread of fires.
27. Provide for escape in case of fire.
28. Protect against electric shock or burns.

29. Protect against gas poisoning.

30. Protect against falls and similar injuries in the living unit and other camp buildings.

31. Provide facilities for safe and proper storage of drugs, insecticides, poisons, detergents, and other dangerous substances.

32. Protect the neighborhood (camp living area) against danger of automobile traffic.

33. Protect the neighborhood (camp living area) against flooding and standing pools of water.

A Five-Day Training Course

for Migrant Health Project Personnel in the

Surveillance of Health Hazards of Sanitation Conditions

in the Working and Living Environments of

Migrant Farmworkers

Module VI: Food sanitation

Prepared by:

Richard F. Clapp

FOOD

A. Operational Procedures

1. Selection of Food Sources

   a. Milk & milk products

   b. Meat & poultry

   c. Bakery products

   d. Other potentially hazardous foods.

2. Food Protection

   a. All potentially hazardous foods refrigerated at 45° or below, except when being prepared or served.

   b. All potentially hazardous foods when stored hot are kept at 140°F or above.

   c. Pork, poultry, reheated leftovers thoroughly cooked to internal temperature of at least 160°F.

   d. Prepared foods not contaminated by raw foods, or surfaces or equipment contaminated by raw foods.

   e. Fruits and vegetables washed thoroughly.

   f. Poisonous materials not stored with foods.

   g. Foods not stored where they may be contaminated by sewage, insects, rodents.

3. Personnel Health and Hygiene

   a. Sick or infected persons not working with food.

   b. Hands frequently washed and clean.

   c. Good hygienic practices used.

4. Cleanliness of Equipment and Utensils.

   a. Kitchen's general appearance neat and clean.

b. Food preparation surfaces effectively cleaned.

c. Kitchen equipment and machinery cleaned and disinfected.

d. Eating and drinking utensils cleaned.

e. Cooking equipment and area clean. No grease build-up.

5. Garbage and Refuse Storage

a. Property stored in containers.

b. Containers covered.

c. Containers cleaned when empty.

d. Storage area clean.

6. Insect and Rodent Control

a. Proper control of flies, roaches, rodents and other vermine conducted.

B. Potentially hazardous foods

The Public Health Service defines potentially hazardous food as "any perishable food which consists in whole or in part of milk or milk products, eggs, meat, poultry, fish, shellfish, or other ingredients capable of supporting rapid and progressive growth of infectious or toxigenic micro-organisms."

The foodborne disease outbreaks reported to the Public Health Service in 1973 for which a responsible food was identified, listed the following foods as involved:

Turkey (15)*	Other Sausage (6)	Potato Salad (7)
Chicken (14)	Chopped Liver	Cole Slaw (2)
Beef (17)	Fish (9)	Bread Dressing (2)
Roast Beef (13)	Tuna Salad	Salad Dressing
Beef Stew (2)	Shrimp (5)	Fried Rice (2)
Hamburger (5)	Lobster (4)	Caesar Salad
Corned Beef	Crab (3)	Soup
Meat Sauce (3)	Eggs (3)	Corn
Gravy (3)	Egg Salad	Waffles
Ham (24)	Ice Cream (4)	Spinach
Pork (12)	Coconut Cream Pie	String Beans
Hot Dogs (4)	Custard	Strawberries

*Number in parenthesis is the number of times the food was reported more than once.

C. Physical Facilities

1. Water Supply

   a. Water comes from a safe source.

   b. Transported water handled, stored & dispensed in a sanitary manner.

   c. Water pipes and connections properly installed and in good repair.

2. Sewage Disposal

   a. Toilet facilities available and convenient.

   b. Toilet room and fixtures clean - in good repair.

   c. Sewage into public sewer - or proper private facilities.

3. Hand-Washing Facilities

   a. Lavatory facilities available and convenient.

   b. Clean and in good repair.

   c. Soap and towels available.

4. Garbage and Refuse Storage

   a. Containers cleanable and tightly covered.

   b. Sufficient number of containers to hold all garbage and refuse between collections.

5. Insect and Rodent Control

   a. Doors, windows and other openings screened.

   b. Building rodent-proofed as necessary.

   c. No rodent harborage on premises.

6. Design, Construction and Installation of Equipment and Utensils

   a. Food contact surfaces easily cleanable.

   b. Utensils easily cleanable.

c. Equipment easily cleanable.

d. Equipment installed, easy to clean around.

7. Structure of Food Preparation and Storage Areas

a. Floors easily cleanable.

b. Walls and ceilings easily cleanable.

c. Natural lighting adequate to see easily, to work, and clean.

d. Enough artificial light available as required.

e. Natural or artificial ventilation sufficient to keep rooms free of steam, fumes, smoke, contamination.

f. Artificial ventilation equipment clean - free of grease.

g. Dressing room and lockers readily cleanable.

D. The Size and Nature of the Foodborne Disease Problem - What the Project Environmentalist Can Do About It

The total number of cases of human illness caused by the eating of contaminated food in the United States each year is not known. It is estimated, however, that there are at least 10 million cases, and probably many more. This is more than all the rest of the cases of disease related to poor sanitation, such as waterborne, vectorborne, sewage and garbage related, etc., put together. There is no indication that the amount of foodborne disease in this country is being reduced; in fact, the situation may be becoming worse.

There are many kinds of illnesses that can be transmitted by foods, but these break down into two principal types; poisonings and infections. A food poisoning results from eating

a food that contains living things, such as germs that cause an infection inside ther person. These may be generally classified as shown with examples in the following diagram:

FOODBORNE DISEASES

POISONINGS	INFECTIONS
Bacterial (ex. Staph. poisoning)	Viral (ex. Hepatitis)
Chemical (ex. Insecticide)	Rickettsial (ex. Q fever)
Plant (ex. Pokeweed)	Bacterial (ex. Typhoid fever)
Animal (ex. shellfish)	Helminthic (ex. Ascariasis)
Fungal (ex. Mushroom)	Protozoan (ex. Amebiasis)

Fortunately, most of the diseases that can be spread by foods do not occur very often. All the evidence indicates that most of the cases are due to only three diseases. These are staphyloccus enterotoxin food poisoning, caused by a poison given off into food by one of the kinds of bacteria; salmonellosis, an infection caused by members of a large group of bacteria; and clostridium perfringens foodborne illness which is caused by the same germ that causes gas gangrene. While the diagnosis and treatment of the foodborne disease may differ a great deal, all of the diseases may be prevented by the effective application of rather simple and well-understood sanitary measures.

Before reviewing these, it is of importance to know where foodborne illnesses are caused, so that we may know where the control measures should be applied. In recent years, the

sources of reported outbreaks of foodborne diseases were distributed as follows:

Source	Percent of Outbreaks
Public Eating and Catering	29.5
Private Homes	22.0
Schools, including Colleges & Universities	15.0
Commerical Processing	13.0
Hospitals and Related Institutions	4.5
Youth Camps	4.0
Private Clubs	2.5
Churches and Social Gatherings, including Picnics	2.5
Others and Unknown	8.0

It is readily seen that outbreaks occur wherever food is prepared and served. Of principal concern to the project environmentalist are those coming from public establishments, especially when they are operated for migrant laborers, and those coming from the private home.

The principles of foodborne disease control are the same for any place where food is stored, prepared and served. When working with a restaurant, cafeteria, cafe, or other commercial establishment, or with food preparation in the home, a great deal can be told just by the general appearance of the place. Where the general appearance is neat, orderly, bright, and clean, the chances are that the whole operation will be reasonably good. When the area is cluttered and disorderly, equipment and materials not properly stored, general indications

of carelessness and lack of concern, it is likely that poor and dangerous conditions will also exist. The first impression one gets of a food operation usually tells a great deal about it.

As an educational measure, the accompanying outlines on operational procedures and physical facilities may be used as a guide for inspection of a food facility. They also serve as the basis for discussing the good practices found, as well as indicating ways in which unsatisfactory or hazardous operations or facilities can be effectively corrected. If the assistance of a public health agency is being sought to improve food hygiene in the project area, use of these forms may help to identify the problems, and later to give an indication of the degree to which they have been corrected.

BASIC FACTORS IN FOOD HYGIENE

PART I

OPERATIONAL PROCEDURES

	Yes	No
1. Selection of Food Sources		
a. Milk & milk products		
b. Meat & poultry		
c. Bakery products		
d. Other potentially hazardous foods.		
2. Food Protection		
a. All potentially hazardous foods refrigerated at 45° or below, except when being prepared or served.		
b. All potentially hazardous foods when stored hot are kept at 140° F or above.		
c. Pork, poultry, reheated leftovers thoroughly cooked to internal temperature of at least 160°F.		
d. Prepared foods not contaminated by raw foods, or surfaces or equipment contaminated by raw foods.		
e. Fruits and vegatables washed thoroughly.		
f. Poisonous materials not stored with foods.		
g. Foods not stored where they may be contaminated by sewage, insects, rodents.		
3. Personnel Health and Hygiene		
a. Sick or infected persons not working with food.		
b. Hands frequently washed and clean.		
c. Good hygienic practices used.		
4. Cleanliness of Equipment and Utensils		
a. Kitchen general appearance neat and clean.		
b. Food preparation surfaces effectively cleaned.		
c. Kitchen equipment and machinery cleaned and disinfected.		
d. Eating and drinking utensils cleaned.		
e. Cooking equipment and area clean. No grease build-up.		
5. Garbage and Refuse Storage		
a. Property stored in containers		
b. Containers covered.		
c. Containers cleaned when empty.		
d. Storage area clean		
6. Insect and Rodent Control		
a. Proper control of flies, roaches, rodents and other vermine conducted.		

BASIC FACTORS IN FOOD HYGIENE

PART II

PHYSICAL FACILITIES

		Yes	No
1.	Water Supply		
	a. Water comes from a safe source.		
s	b. Transported water handled, stored & dispensed in a sanitary manner.		
	c. Water pipes and connections properly installed and in good repair.		
2.	Sewage Disposal		
	a. Toilet facilities available and convenient		
	b. Toilet room and fixtures clean - in good r pair.		
	c. Sewage into public sewer - or proper priva e facilities.		
3.	Hand-Washing Facilities		
	a. Lavatory facilities available and convenient		
	b. Clean and in good repair.		
	c. Soap and towels available.		
4.	Garbage and Refuse Storage		
	a. Containers cleanable and tightly covered.		
	b. Sufficient number of containers to hold all garbage and refuse between collections.		
5.	Insect and Rodent Control		
	a. Doors, windows and other openings screeded.		
	b. Building rodent-proofed as necessary.		
	c. No rodent harborage on premises.		
6.	Design, Construction and Installation of Equipment and Utensils		
	a. Food contact surfaces easily cleanable.		
	b. Utensils easily cleanable.		
	c. Equipment easily cleanable.		
	d. Equipment installed, easy to clean around.		
7.	Structure of Food Preparation and Storage Areas		
	a. Floors easily cleanable.		
	b. Walls and ceilings easily cleanable.		
	c. Natural lighting adequate to see easily to work and clean.		
	d. Enough artificial light available as required.		
	e. Natural or artificial ventiliation sufficient to keep rooms free of steam, fumes, smoke, contamination.		
	f. Artificial ventilation equipment clean - free of grease.		
	g. Dressing room and lockers readily cleanable.		

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Module VII: Water Sanitation

Prepared by:

Gilbert L. Kelso

Water Supply Sanitation

I. Introduction

A. Water is necessary for all life.

B. The water that supports man's life must not bring him germs and chemicals that will poison his body and make him sick or die.

C. There must be enough water for drinking, cooking, washing, bathing and for flushing away body wastes and protecting him from injury or death by fire.

II. Water and Disease

A. Diseases carried by water are diseases of the intestinal tract. They are caused by germs in the body wastes of people who have the disease or have had it at some time in the past, but are not sick now (carriers).

B. If enough of these body wastes get into the water used for drinking, cooking, bathing or washing, the persons using the water may become sick.

C. Germs in the water can cause the following diseases.

1. Typhoid fever	2. Paratyphoid fever	3. Dysentery
4. Cholera	5. Amebic dysentery	6. Tularemeia
7. Infectious hepatitis	8. Schistosomiasis	9. Diarrhea

D. Chemicals in water can make people sick.

1. Barium	2. Cadmium	3. Chromium	4. Cyanide
5. Fluoride	6. Lead	7. Selenium	8. Silver
9. Mercury	10. Pesticides		

E. Nitrate poisoning - Cyanosis - Methemeglobinemia - Blue Babies

1. Makes babies sick if their milk is made from powder or liquid thinned with water containing too much nitrate nitrogen (10 mg per liter as nitrogen or 45 mg per liter as NO_3).

2. This most often happens when the water is from unprotected shallow wells, or sources that get drainage from farming or factories.

III. Where does water come from? Exchange of water between the earth and the atmosphere. The hydrologic cycle.

A. Water is being exchanged between the earth and the atmosphere all of the time.

B. Water from the ocean, lakes, streams, reservoirs, wet ground and plants is changed to a gas called water vapor.

1. An acre of corn gives off 3,000 to 4,000 gallons of water to the atmosphere in a day.

2. A big oak tree gives off about 40,000 gallons of water per year.

3. Water is carried up into the atmosphere where clouds are formed.

4. When temperature, wind, and other conditions are right, it returns (condenses) to earth as rain, snow, hail, sleet or dew.

C. Surface water

1. Water that has fallen to the earth as rain or snow and run into rivers, lakes, ponds, reservoirs, or the ocean.

2. Surface water usually contains germs, mud, and other undesirable substances which it picks up as it flows over the earth.

3. Sewage (human wastes) from cities and drainage from farms and factories is emptied into streams, ponds and lakes.

4. Surface water, with very few exceptions will need to be purified to make it safe and desirable for people to use.

5. Surface water should be considered unsafe until tests and inspections prove it to be safe.

D. Ground Water

1. Water that has fallen to the earth as rain or snow, is soaked into and through the soil and rock formations, and then springs, or is pumped from wells.

2. Ground water may be less polluted than surface water if it has seeped through soil which has not received human wastes or other undesirable drainage.

IV. Adequacy of water supply. How much water is needed?

A. The amount of water people use is determined by:

1. The way we live.

2. How easy it is to get water.

3. Kind of plumbing.

4. Air temperature.

5. Water quality.

B. Water usage according to availability

Type of dwelling	Gallons per person per day	Liters per person per day
Camp with hot & cold running water. Kitchen, laundry shower baths and flush toilets	45	170
Camp with flush toilets	25	95
Camp without running water or flush toilets	5	19
Household having one pressure faucet at kitchen sink	15	57
Hot & cold running water. Kitchen laundry and bath	50	190
Household having one hand pump	10	38

V. Availability and Acceptibility

A. Water must be pleasant, desirable and convenient to use as well as safe to use.

B. People generally will not use water if:

1. It is muddy.
2. It tastes and smells bad.
3. It stains clothing, dishes and utensils.
4. It is hard, requiring large amounts of soap and leaves scum on pans, tubs and clothing.
5. It makes them sick.

C. People will go instead, to a stream, spring, or well of unknown safety and use the water or carry it home to use.

D. Cleanliness is one way to prevent the transfer of intestinal diseases from one person to another. Cleanliness depends upon having enough good water readily available.

E. Dysentery in Georgia & Florida. Studies showed that where enough water was available in a household, the number of families having positive dysentery cultures was smaller than in those households with water less available.

Percent of Families Showing Positive Cultures for Dysentery According to Availability of Water

Type of dwelling according to availability of water	Percent of Families positive
Building with faucet, shower and/or toilet	2.5
Building with faucet only	6.2
Building with no plumbing inside	11.0

VI. Protection of the water bearing aquifer. Underground veins of water.

A. Protection of ground water sources means preventing water from the surface of the earth from running into wells or springs, and making sure that the

water in the ground is not receiving sewage or drainage through limestone channels, sinkholes, abandoned wells or from privies, cesspools or other drains dug into the underground water.

B. The water in the underground veins from which supplies are taken (aquifers), has been filtered by passing through soil, sand and rock and may be less polluted than surface water.

C. In some parts of the country, rock is limestone and this rock may have channels dissolved in it which provide very little or no purification for the water passing through it.

1. These channels may have openings to the surface called "sinkholes".
2. In someplaces it is the custom to empty sewage and other wastes into these sinkholes and it then may enter the underground water.
3. For this reason, wastes should not be discharged into sinkholes and water supplies drawn from limestone rock should be carefully checked for well construction and water purity.

D. Wells are openings or shafts sunk into the underground water veins and springs are openings where the water flows out by gravity.

1. If sewage or other waste enters abandoned wells, springs, or sinkholes, it can enter the underground water and make it unsafe to use.
2. Privy pits, cesspools and septic tank systems should not be dug into the underground water table.

VII. Types of water sources. Wells-springs-cisterns-other.

A. Wells

1. Wells are classified according to construction as: dug, driven, bored and drilled.

2. Location of wells with respect to sources of contamination.

   a. Many things affect the determination of a safe distance between a well or spring and a source of contamination. Exact distances cannot be set.

   b. Wells should be located on ground higher than the source of contamination.

   c. Surface water should be drained away from the well by a diversion ditch.

   d. Least distance between water sources and sources of contamination is 100 feet (instructor should determine the distance used in local codes and use that).

Contamination Source	Sell or Suction Line
Septic tank	50 feet
Disposal field	50 feet
Seepage pit	100 feet
Dry well	50 feet
Cesspool	150 feet

3. Wells differ in size, depth, and methods of construction. Methods of protection are similar.

4. Parts of a well system.

   a. Casting or lining.

      (1) To keep the well from caving in.

      (2) To prevent surface water from entering the well.

      (3) To prevent water from polluted or otherwise undersirable underground sources from entering the well.

      (4) The casing may be of brick, stone, tile, concrete, metal or wood. (If wood, it may be called cribbing)

b. Drop pipe

(1) The pipe through which water is pumped from the well.

(2) Inside the casing into the water in the well.

(3) Various arrangements of valves, cylinders, seals and pumps connected to the drop pipe.

c. Cover. Also called slab, platform, curb.

(1) The cover for the top of the well. It rests on a collar of concrete around the top of the casing.

(2) Almost always made of concrete. Some may be of wood or metal. Must be watertight.

(3) To prevent surface water or other things from entering the well.

d. Well pits.

(1) In some places wells are drilled, driven or bored from the bottom of pits 4 to 6 feet deep.

(2) Pump, tank and other equipment is placed in pit to protect against freezing.

(3) Pits are undesirable, as they are a place for surface water to collect and run into the well.

(4) Pits, if used, should have free flowing drain protected against water backing into it.

(5) Pump houses on top of the ground should be used instead of pits. Existing pits should be replaced with pump houses.

e. Well seal.

(1) To close the space between the casing and drop pipe at the top of the well.

(2) To prevent entry of surface drainage and other material.

(3) Must overlap the casing.

(4) Hand and electric pumps with properly constructed watertight seals can be used.

f. Pumps.

(1) Pumps are machines used to move water from a well or other source to the place where it is needed.

(2) Either "hand operated" or power operated, usually electricity.

(3) Some have a cylinder with a piston often called a "sucker" with gaskets called "leathers".

(4) If the cylinder is in the pump at the top of the well, it probably cannot raise the water more than 25 feet.

(5) Pumps with cylinders are often called shallow well pumps or "pitcher pumps".

(6) Electric pumps may have cylinders or be of the kind known as "centrifugal" or "rotary". They move the water by spinning blades.

(7) Some electric pumps are made so that they can be installed in the casing under the water. They are called "submersible" pumps. When submersible pumps are used, only the top of the casing and the electrical wires can be seen above the ground.

(8) Priming pumps.

(a) If water drains out of the pipes connecting the pump to the water in the well, and/or the gaskets (leather) in the pump cylinder (sucker) dry out, it may be necessary to "prime the pump" to make it work.

(b) This is done by pouring or forcing water into the pipes, displacing the air and making a full column of water from the pump to the water in the well.

(c) Priming pumps or wells is a dangerous practice, as unsafe water may be used for priming, and thus enter the well and pipes and later come out of the pump and system.

(d) If it is necessary to prime a pump, only water of safe sanitary quality should be used.

(e) If a hose or pipe from another supply, such as an irrigation system, or cooling system, is connected to a pump for priming, it should be determined that the water from the system used is of safe sanitary quality. The connection should be removed after each use or it will be a possible route for contamination of one of the supplies. (See "cross-connections and back siphonage VIIB)

(f) A pump or system that has to be primed most of the time is defective and needs repairs. It should be considered unsafe.

g. Pressure tanks. Hydropneumatic tanks.

(1) Pressure in a system served by an air (pneumatic) pressure tank, is maintained by pumping water directly to the tank from the source.

(2) This pumping compresses the air trapped in the tank.

(3) Air pressure equal to the water pressure in the tank is controlled by means of pressure switches which stop the pump when the high pressure is reached, and starts it when the low pressure is reached.

(4) Pressure tanks may become "water logged". They will not then provide enough pressure, and the pump will operate more than necessary. This should be corrected by a person trained in the operation and care of these pumps and tanks.

h. Pump houses.

5. Dug wells

a. Usually not more than 50 feet deep. Three to 20 feet across.

b. Because the water is from close to the surface, and the well is shallow, it is likely that:

(1) The well will be dug "by hand" with pick and shovel, or power equipment, like a clam shell bucket.

(2) The location and protection of the well is of special importance.

(3) The water will contain germs.

(4) The water may be "softer" than water from deep wells in the same area.

(5) It will have a hand pump.

6. Bored wells

a. Usually not more than 100 feet deep.

b. Protection is essentially the same as for all wells.

c. Bored with earth augers turned either by hand or power equipment.

d. They are best suited for low water requirements and where the soil is noncaving and does not contain boulders.

7. Driven wells

a. Usually not more than 50 feet deep.

b. The simplest and cheapest type of well.

c. Constructed by driving a pipe (drive pipe) with a pointed and slotted end section (well point) into the soil containing the water.

d. The "drive pipe" is sometimes used as a combined casing and drop pipe. It is considered better to have a drop pipe inside the drive pipe casing.

e. Protection is essentially the same as for all wells.

8. Drilled wells

a. May be down to 1000 feet deep. Usually between 100 and 500 feet deep, depending upon the depth of the underground water.

b. Protection is essentially the same as for other wells. Special attention must be given to the many devices used for sealing the space between the casing and drop pipe.

c. Usually supply larger quantities of water than other types.

d. Power operated pumping systems most often used.

B. Springs

1. Underground veins of water that flow to the surface.

2. The widespread idea that spring water is always "pure" water, is not true

3. Springs must be properly located and protected from surface, and other things getting into them.

a. Spring box. Locked, overlapping, watertight cover to prevent "dipping" and entrance of small animals, insects, and other contaminating material.

b. Ditch to divert surface drainage. (Diverson ditch)

c. Overflow pipe or sanitary pump installation to obtain water.

4. Limestone spring water is not likely to be purified by flowing through the rock channels. It may carry pollution for long distances.
5. Spring water should be considered unsafe until surveys and tests show it to be safe.

C. Cisterns

1. Reservoir - used to store rainwater in places where it is the only adequate or desirable water supply. Commonly used to store rainwater in areas where groundwater is objectionably hard.
2. Watertight, protected tank, underground or aboveground for storage of rainwater.
3. Rainwater usually collected from building roofs. Sometimes from a specially prepared area, fenced and protected from surface drainage and contamination.
4. Collection piping must provide for the first part of each rain to run to waste after washing off the collection area (roof).
5. Strainers or screens must be included in the system to keep leaves, sticks, and other undesirable material out of the cistern.
6. Some cisterns have filters of sand, gravel and charcoal, or porous bricks. They are generally poorly cared for and may add contamination instead of removing it.
7. Leaves and roofing materials may make cistern have a brown color.
8. Cistern should be considered unsafe until tests and surveys prove otherwise.
9. Cistern water used for drinking and preparing food should be tested regularly and often.

D. Small water purification plants.

1. For the removal of mud, hardness, iron, or objectionable substances.
2. Cannot be depended on to remove all impurities, including germs.
3. A trained and dependable person must be made responsible for care and operation of the plant.

E. Public water supplies. (Municipal supplies)

1. Usually a safe and adequate source of water.
2. Water pressure should not often change, or go off and on.
3. If water from a public supply is stored in a camp tank or repumped, someone must be made responsible for care of the pumps, pipes, and tank.

VIII. Protection of the water distribution systems (plumbing)

A. When water is piped under pressure to living quarters and work buildings, there is always the possibility that it can become unsafe because of improperly made connections, or improper use of equipment.

B. Cross connections.

1. Connections between a safe and unsafe source of water.
   a. Fire protection systems
   b. Irrigation systems
   c. Cooling water systems
   d. Flushing connections
   e. Pump priming
   f. Pressure tanks on spraying equipment

C. Back siphonage

1. The "sucking" of unsafe water into a safe water system.

a. When the pressure drops (becomes weak) or goes off entirely because too much water is being used, the pumps fail, or the tanks run dry.

2. Back siphonage can be through:

a. A hose put into a septic tank, drain, chemical tank.

b. Some types of pesticide sprayers and fertilizer sprayers may permit the chemical to get back into the water pipes.

c. Any inlet beneath the water in a plumbing fixture.

D. Protection against danger from cross connections and back siphonage.

1. No direct connections between safe and unsafe supplies. Fixtures connected to both sources or to both water and sewerage are the most likely to be the source of trouble.

a. "Broken" connections

b. Tanks with float valves

c. Air gaps

2. Plumbing fixtures

a. No submerged inlets

b. Hoses used for filling tanks or sinks not left under water

c. Use of vacuum breakers

d. Some fixtures require certain pressure and amounts of water

IX. Disinfection (Define - sterilize, disinfect, antiseptic, sanitize)

A. Killing disease germs in the water. Different chemicals can be used, but chlorine is the most widely used today.

B. Chlorination

1. The addition of chlorine gas from cylinders of the compressed gas.
2. The addition of solutions of calcium hypochlorite(Eg. Trade names HTH, Pittchlor, Perchloron and many others). The dry powder is 70% available chlorine.
3. The addition of solutions of sodium hypochlorite. A clear solution with various concentrations of available chlorine up to 17%.
4. Chlorinated lime or "bleaching powder". A powder that does not completely dissolve. Contains 25% to 30% available chlorine.

C. Chlorinators

1. Machines that measure and add the predetermined amount of chlorine to the water.
2. Hypochlorinators for measuring and adding solutions of calcium or sodium hypochlorite. (See above).
3. Gas feed chlorinators.
   a. For treating large amounts of water.
   b. High cost of equipment and safety rules for handling compressed chlorine gas, limits the use of gas chlorinators to large water systems.

D. Chlorination terminology.

1. Chlorine residual. The amount of chlorine left in the water after a stated time. Eg. The residual chlorine is 0.5 ppm after 30 minutes.

2. Parts per million. Ppm. The unit used to express amounts of chlorine and other chemicals added to or in water. It is 1 part in a 1,000,000 of water by weight.

1% equals 10,000 parts per million (ppm)
1 part per million (ppm) equals 1 milligram per liter
1 part per million (ppm) equals 8.3 pounds per million gallons of water

3. pH

(a) pH is a measure of acidity or alkalinity of the water using a scale of 0.0 (acid) to 14.0 (alkaline) with pH7.0 being neutral.

(b) Most natural water will be between pH 5.0 and pH 8.5.

(c) Chlorine kills germs much faster in waters of low pH (acid) than in waters of high pH (alkaline).

E. Testing for chlorine in water

1. Orthotolidine test. A solution of orthotolidine is added to some water in a test tube. If the water contains chlorine, it will turn yellow. The more chlorine in the water, the deeper the yellow color.

2. Test kits can be purchased to make this test and give the result in parts per million.

X. Protection and use of water after it leaves the distribution system.

A. Tank trucks.

1. Should be used only for hauling safe water.

2. If they have been used for hauling gasoline, chemicals (pesticides), fertilizer or liquid wastes, they should not be used for drinking water.

3. Tank trucks used for hauling drinking water should be cleaned and sanitized regularly, by a method approved by the health department.

   a. Cleaning methods used are solvents, detergents and steam.

   b. After cleaning, they should be tested for germs and chemicals.

4. The tanks should have sanitary piping, faucets and valves. This means that they can be taken apart for cleaning.

5. If hose is used, it should not be used for any other purpose.

B. Sanitary drinking fountains

1. Diagonal jet with guards, so that the mouth of the user cannot touch the water outlet, and drippings from the mouth of the user cannot fall on the water outlet.

2. Water outlet above the rim of the bowl so a plugged drain will not flood it.

3. Pressure regulator so that jet will be at proper height.

4. Water inlet pipe is not inside drain pipe.

XI. Water used for swimming recreation.

A. Swimming pools

1. Swimming pools with properly operated filters and water treatment equipment are the safest places to swim.

2. Water in a properly operated swimming pool can be kept safe. It should be chlorinated or disinfected by some other approved method.

B. Streams, lakes and ponds.

1. The condition of the water is determined by the land from which it drains (watershed).

2. Rivers, lakes, and ponds receiving sewage and farming wastes should not be used.

3. Local health departments should be able to give advice about the safety of swimming places.

XII. Sampling and testing.

A. Most health departments will sample and test water if requested.

B. Samples should be collected by a trained person from a health department.

C. Samples must be taken in a container (bottle) furnished by the health department.

D. Health departments will not take samples from unprotected sources such as open wells, tanks and similar containers, ponds, and streams.

E. Water samples are analyzed for the presence or absence of coliform group bacteria.

1. Coliform group bacteria are always present in the wastes (feces & urine) of people and warm blooded animals. Thus, they are present in soil, sewage, ponds, streams, and lakes which receive surface drainage.

2. The presence of coliform group bacteria in drinking water means that it has received wastes from humans, animals, or polluted soil, and is therefore considered unsafe to use. Germs of disease could enter the drinking water in the same way the coliform group bacteria entered.

XIII. Emergency water disinfection.

A. Clear water only should be used, if possible.

1. Stream water should be taken upstream from any known source of pollution.

2. Floating material should be removed, and mud allowed to settle if no other clear water is available.

B. Methods of emergency disinfection.

1. Boil for one full minute. The "flat" taste of boiled water can be improved by pouring from one container to another to aerate it; by allowing it to stand for a few hours; by adding a small pinch of salt to each quart of water.

2. Chemical.

a. Chlorine bleach (Clorox, Purex, etc.)

(1) Follow directions on the label.

(2) If no directions, use following amounts:

Available chlorine on label	Drops per quart of clear water
1%	10
4-6%	2
7-10%	1

(3) The bleach should be thoroughly mixed with water and allowed to stand 30 minutes before using.

b. Calcium hypochlorite (HTH, Perchloron or other 70% available compound)

(1) One heaping teaspoon of the compound dissolved in two gallons of water.

(2) Add one pint of the solution to each 12.5 gallons of clear water.

(3) Allow to stand 30 minutes before using.

c. Chlorine tablets (pills).

(1) Can be purchased from drug stores and camping supply stores.

(2) If instructions are not on the container, use one tablet for each quart of clear water for purification.

d. Iodine

(1) Common household tincture of iodine 2% U.S.P.

(2) Add 5 drops to each quart of clear water. Add 10 drops to each quart of turbid water.

(3) Allow to stand at least 30 minutes before using.

e. Iodine tablets.

(1) Can be purchased from drug stores or camping supply stores.

(2) If instructions are not on the container, use one tablet for each quart of water.

3. Emergency disinfection should be for water used for drinking, cooking, making prepared drinks, or brushing teeth.

4. Do not fail to wait 30 minutes after adding the disinfectant. This is as important as the amount of disinfectant to be added.

5. The pH, temperature, and clearness of the water all have an effect on the time required for chemicals to disinfect it.

XIV. Summary

A. A proper water supply that will not cause the person using it to become sick, is necessary for all life.

B. Such a supply may come from:

1. Surface water sources that are properly treated.

2. Ground water sources that are safe and kept that way by proper protection and/or treatment.

3. Rainwater stored in properly protected cistern.

C. The protection of the water supply after it leaves the well or distribution system is most important.

1. To prevent contamination by cross connections.
2. To prevent contamination by back siphonage.
3. To prevent contamination in handling. Tank trucks, drinking fountains.
4. Sampling and analysis to make sure that treatment, protection, and proper handling is effective.

D. Emergency disinfection is important whenever there is doubt about the safety of the water.

A Five-Day Training Course
for Migrant Health Project Personnel in the
Surveillance of Health Hazards of Sanitation Conditions
in the Working and Living Environments of
Migrant Farmworkers

Module VIII: Sewage Sanitation

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SEWAGE SANITATION

I. The Importance of Proper Sewage Sanitation

A. Important in Preventing the Spread of Disease

Feces and urine from people and animals and waste water from bathing, clothes washing, food preparation and other activities contains germs that can make people sick. Years ago sewage disposal was not a problem because people did not live close together. Now, with people crowded together, the transmission of disease because of improper sewage disposal is a constant threat.

B. Diseases that may be caused by contact with sewage are:

1. Diarrhea and dysentery.
2. Typhoid and paratyphoid fever.
3. Hepatitis.
4. Ascariasis. Worms or eggs of worms. The intestinal round worm. Hookworm. Worm infestation eventually leads to poor nutrition, especially in children.

C. If the farmworker or his family is exposed to these wastes and get them on their clothing, in their food, or in their drinking water they can become sick with one or more of the above diseases.

D. Because of this, sewage must be isolated and ultimately disposed of in such a way that it cannot contaminate the worker or his environment. If flies, roaches, rats, and other insects or animals can get to the sewage the feces and urine may stick to their feet and/or fur and be carried to food, water, and clothing.

II. The Sewage Sanitation System

A. The Toilets

1. Accessibility. The distance of the toilets from the living quarters. People will not go unreasonable distances to toilets, but will urinate or defecate on the ground.

2. Cleanliness. The toilets (bowls), toilet seats, and floor must be kept clean. No feces or urine on them; no dirty toilet paper or other trash on the toilets or floor. Men's urinals must be clean and not stopped up with cigarette butts, paper, or other trash.

3. Ventilation. There must be some way for air to move in and out of the room--windows, ventilators, fans. This removes odors and condensation (moisture). A clean toilet room does not have an odor.

4. The plumbing fixtures (toilets, urinals, hand washing and drying facilities) must be in working order. No stoppage resulting in flooding. Toilet rooms must be screened or have other acceptable means of insect control. This can be determined by absence of insects.

B. Methods of Sewage Disposal

1. Water carried. If the toilet can be "flushed" with water the wastes should go to a sewer that flows to a sewage treatment plant or to a septic tank disposal system.

a. Sewer systems are generally operated by some unit of local government (city, county, sanitary district). A properly designed and operated system will include treatment of the sewage before it is emptied into a stream or other body of water. This is the best way to collect and dispose of sewage.

b. Sewage treatment plants. These are usually operated by the local government. Sometimes, however, large farmworkers living installations will have their own sewage treatment plants. These are often called "package plants" because they are a part of a standard design and many of the units are prefabricated. The most important factor in the surveillance of these plants is to make certain that a competent person has been assigned responsibility for its maintenance and operation and is given the resources to do the job.

(1) Make certain that all of the sewage is kept within the plant. No sewage running on top of the ground or spilling out of the tanks.

(2) No way for children and small animals to get to the sewage.

c. Septic tank systems. The sewage is discharged to a tank of sufficient capacity for a 24-hour flow. As the sewage passes through this tank the solids settle out and a relatively clear liquid (effluent) flows out of the tank to a subsurface drainage system that enables the liquid to be soaked into the soil, or to a stabilization pond or other safe means of disposal.

(1) The septic tank and drain pipes can be located by inquiring of the manager or from the health department. For many years all good health departments have required permits for the installation of sewage treatment facilities and these permit applications have a requirement of a sketch showing details of construction and location of the facility.

(2) If a septic tank system is not working properly, one or more of the following conditions will result:

(a) Clogged pipes. The fixtures will overflow.

(b) At the septic tank and drain field there will be small pools of bad smelling water, feces, or wet toilet paper. The wastes are not being isolated and kept underground. This dirty water is just as dangerous as sewage.

(c) Sometimes systems are changed so that pipes empty onto the top of the ground or into dry ditches or streams or ponds.

(3) The septic tank system and its drainage system must be at least 100 feet away from and downhill from the well.

2. Non-water carried sewage disposal. If the toilet does not have water in it and cannot be flushed with water, then the wastes go to a privy or chemical toilet. The privy is a common way of holding human wastes in one place when there is no water available for flushing them into a sewer or septic tank system. The privy is a satisfactory method of disposing of human wastes if it is properly constructed and maintained. However, it can cause trouble if wastes are allowed to get onto the top of the ground so that children, small insects, and insects can get to them. The inside of the building and toilet seats must be kept clean.

a. An earth-pit privy is a pit or hole dug in the ground to receive and isolate the feces and urine. For a single family it is usually 6 to 8 feet in depth and 36 to 42 inches square. The lengths will be greater for privies used by large groups

of people. The pit should not penetrate the ground water table. When the pit is filled to within 18 inches of the top a new pit should be dug and the privy structure moved to the new pit. The properly constructed pit, slab, riser with seat cover, and screened vent constitute a sanitary unit without the building. The building is provided for privacy and comfort. What to look for when checking a pit privy:

(1) Distance to the kitchen or eating area. It should be at least 100 feet away.

(2) Distance to the well. It should be at least 100 feet and downhill from the well.

(3) Distance to a pond or stream. It should be less than 50 feet.

(4) The pit must be constructed so that water drainage, insects, and small animals cannot enter.

(5) The pit is not too full. Less than 18 inches from the floor.

(6) Seats and urinals are clean.

(7) The privy is not being used for disposal of garbage, trash, and other items. Feces and urine only.

b. A vault privy is used if the ground water table is close to the surface or if it is necessary to construct privies near wells. These are the same as earth-pit privies except that the vault is lined with concrete to make it water-tight. The contents of the pit must be removed for ultimate disposal in a sanitary manner by burying or dumping into a sewer

system. The successful use of this type privy depends entirely on proper servicing.

c. A box and can privy may be used when a pit cannot be dug, or the privy must be portable (such as for use in the fields or on vehicles). It is constructed so that the feces and urine are caught in a can or bucket under the seat. The containers are emptied and cleaned and the wastes carried away for ultimate disposal in a sanitary manner. The successful use of these units depends on proper servicing.

d. A chemical toilet is like a vault toilet. There is a toilet over a container (tank) of iron or concrete. When the feces and urine drop into the container they mix with a caustic soda (lye) solution. There is usually a lever near the toilet seat that is pulled to move a paddle in the container to mix the solution and the fecal matter. The waste is converted to a thick, odorless, and harmless liquid. It may be buried, hauled to a sewer system, or dried on sand beds and used for fill or fertilizer. What to look for when checking a chemical toilet:

   (1) Is the chemical being added and do the paddles work and mix it with the feces?

   (2) Is the container too full so that the solution can splash on a person and cause a burn?

   (3) Is the tank vented and is the vent working?

e. The portable privy is a combination of the chemical toilet and the box and can privy adapted to use in the fields, in recreational areas, and on vehicles. When used in the fields it eliminates the need for the worker "going" behind the

bushes, thus creating a health hazard. The feces are caught in a container under the seat which may contain emulsifying, deodorizing, and disinfecting chemicals. The important health factor in the use of these units is to be certain that the contents are disposed of in a sanitary manner and that they are kept clean. The portable privy is very light, can be picked up and moved so as to have it available to the workers. They can be rented under various trade names from companies that will also service them. They may be hauled on trailers by buses or trucks that carry farmworkers to the fields. Some units may be equipped with portable handwashing facilities.

3. Oxidation Ponds or Lagoons.

   a. Wastes from toilets, showers, and other activities is carried by water (flushed) to a tank much like a septic tank. After flowing slowly through this tank so that solids can settle out, the liquid is discharged to a large shallow pond. The sun and air helps the bacteria and other organisms in the pond use the organic matter in the waste and make it cleaner. This "cleaned" liquid then runs into a stream or other body of water. Raw sewage may also be treated by a modification of this method. These ponds can become an odor nuisance if they are too close to living or dining areas. What to look for when checking an oxidation pond.

      (1) Is the pond the cause of bad odors around the living quarters?

      (2) There should be a fence around the pond to keep out people (especially children) and animals.

(3) The pond should not contain large floating pieces of feces.

(4) The pond is not a breeding place for flies and mosquitoes.

C. Other Liquid Wastes. Kitchen-Showers-Washrooms-Laundry.

1. Kitchen wastes from large or communal type kitchens. When food is prepared, water is used to wash the food; cook it; wash pots, pans, and dishes; and clean the floor. The water used to do these things picks up pieces of food, dirt, grease, and germs. It is now dirty and has germs in it so it must be taken care of just like feces and urine. It should not be in contact with people.
2. Does the kitchen and dining area have a toilet? Where does the sewage go?
3. Septic tank systems and sometimes even sewer systems receiving kitchen drainage may have grease traps to keep the grease out of the sewage system. Grease traps are small tanks which are supposed to remove the grease from the waste by allowing it to rise to the top of the tank. They are most generally found under the kitchen sink, but may even be buried outside the building. They are often a source of trouble because they are not properly serviced. Check to see if there is a grease trap and if the responsibility for servicing it is understood. An improperly serviced grease trap will result in clogged sewer lines.
4. Kitchen slops are not to be thrown out the door onto the ground.
5. If family kitchens are provided it is important that the cooking and cleaning water from these kitchens is not thrown onto the ground but is put into a sink or drain that goes to a sanitary disposal system.
6. Shower, laundry, and washroom wastes contain soap, dirt, grease, and germs. They should go to a disposal system or drainage system.

a. Septic tank-drain pipe system. Look for the same trouble signs as discussed before.

b. A seepage pit or cesspool is a large hole dug in the ground. It is much larger than a privy pit and is filled with small rocks. It has a cover with an opening for cleaning. The used water from the washroom, shower, and laundry go through a pipe into the seepage pit, and trickles out or soaks into the surrounding soil.

c. Toilet wastes (sewage) should not be put in a seepage pit. In most places it is against the regulations of the health department.

d. What to look for when checking shower, laundry, and washroom waste disposal:

(1) Look to see that the used water does not drain out of the sink or floor drain directly onto the ground.

(2) Look to see that if wash buckets or laundry machines are used, the water is not just thrown on the ground.

(3) Find the seepage pit outside and look at it to see if it is overflowing. Look for smelly, soapy gray water. Is it possible for rain water to get into the pit?

(4) The seepage pit should be at least 100 feet from the well, and on lower ground.

D. Animal (Dog) Wastes in the Farmworkers Living Area. Other animals besides man make body wastes that can be harmful. One animal that causes trouble is the dog. Dogs carry germs and worms that can make people sick. Dog wastes on the ground can be stepped on, played in by children, and walked in by flies. The flies then carry the waste and germs to peoples food and water. Look to see if dog wastes on the ground are a problem. If so, then these wastes should be shoveled up and buried, or at least covered with dirt.

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Migrant Farmworkers

Module IX: Solid Waste Sanitation

Prepared by:

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SOLID WASTE SANITATION

I. The Importance and Nature of Solid Waste Sanitation

A. A solid waste is any waste that cannot be carried away by free flowing water or air.

B. Refuse is anything its owner refuses for further use.

C. Garbage is food rejected at any point from growing to final eating.

1. Garbage can rot and as it rots it stinks. It adds pollutants to our air, our surface water and our groundwater.
2. It is food for many insects, rodents, other small animals and a few less familiar scavengers. The odor of the rotting garbage attracts both insects and small animals.

D. Rubbish is non-rotting wastes being produced in increasing amounts.

1. Burnable wastes. Paper, cardboard, wood, cloth, rubber, leather, some plastics, grass and shrub clippings, leaves and tree prunings.
2. Nonburnable wastes. Metals, glass, ceramics, nonburnable plastics which only melt, concrete, some dusts grit and sand.
3. Oversized discards. Abandoned cars, kitchen stoves, refrigerators washing machines, clothes driers, TV sets, old mattresses, beds sofas, chairs, trees, stumps etc.

E. Quantities of solid waste.

1. Seven pounds per person per day. This is from a survey that included commercial and municipal wastes.
2. Probably closer to 3 to 5 pounds per person per day from farmworkers living quarters, depending on the kind of quarters.

II. Solid Waste and Disease

A. Circumstantial and epidemiologic information support a conclusion that, to some diseases, solid wastes bear a definite, if not well defined, causal relationship.

B. Diseases transmitted by insects, infected small animals, direct contact, and water and soil pollution. The intestinal diseases.

C. The garbage provides the food, the attraction and the breeding places. The rubbish and trash provide the shelter.

1. In warm climates, exposed garbage has been found to produce as many as 70,000 flies per cubic foot in a week.
2. Home refuse cans with accumulated residues and loose garbage have produced over 1,000 fly larvae per week. One was found that produced over 20,000 larve in a week.

D. Insect and rodent-borne diseases will be discussed in Presentation K.

III. Solid Waste Handling and Disposal

A. Storage and handling on the premises at the source.

1. Separate and combined storage. The type of storage will be determined by the method of ultimate disposal.
2. If the edible garbage is to be fed to animals it will have to be stored separately. Should not exceed 20 gallons capacity and have covers that can be secured to prevent animals from spilling the garbage on the ground.
3. If all of the solid waste goes to a sanitary land fill it usually can be put in one container. Mixed refuse containers should not exceed 30 gallons capacity and have tight fitting covers.

4. All containers should be made of impervious material and be of sanitary construction. This means that all surfaces which the solid waste touches are accessible for cleaning.
5. Plastic film bags of high strength are now widely used. They must be protected from destruction by animals.
6. Large storage containers for pickup or transfer to special trucks (Dempster Dumpster system) are now widely used where large quantities of solid waste originate. They must be cleaned regularly. Insects and small animals can gain entry, if doors are left open or are damaged in handling so that they will not close.
7. Garbage grinders installed in sinks convert grindable garbage to sewage and it goes down the sewer. These units are not likely to be found in farmworker's residences. It does not completely solve the problem, as cans, glass, paper and plastic must still be disposed of.
8. What to look for when checking solid waste storage.
    a. Is the waste stored in a sanitary manner? Is it in impervious containers and inaccessible to animals?
    b. Are the containers cleanable and are they clean and in good condition?
    c. Is the waste in the containers and not scattered on the ground?
    d. Is the waste collected often enough to prevent breeding of flies? At least twice weekly.

B. Solid Waste Collection.

1. Waste should be collected twice a week in warm weather.
    a. Less frequent collections will permit fly larvae to complete their growth, mature and become pests around the living quarters.

b. Flys carry germs from the waste to the food and water of the workers.

2. Counties, cities and towns usually provide waste pick-up service in special trucks.

a. The trucks must be constructed and operated so that waste is not scattered on the ground and the liquid from the waste does not run onto the street or ground. This liquid, as it drys, will cause very disagreeable odors.

b. The waste collections be on a schedule at the same time each week so people will know when to have waste at the collection point.

3. What to look for when checking solid waste collection.

a. Are collections made not less than twice weekly?

b. Are collections made on a regular schedule so people can depend on the waste being collected at a definite time?

c. Are the collection trucks clean and covered so that waste does not drop and blow off? Are they watertight so that liquid from the waste does not leak on the ground and street?

d. Is waste spilled on the ground at the collection point?

C. Solid Waste Disposal.

1. Individual or small group methods. If no community pickup service is provided, single families or small groups may have to dispose of refuse the best they can.

a. Backyard burning. This is the least satisfactory method of disposal. Even if bottles and cans are separated out and disposed of in another way, it is usually not possible to

burn all the waste; hence, flies and rodents will be attracted to what is left. Backyard burning is now illegal in most communities because of the emphasis on air pollution control.

b. Burying. In a few situations a plot of ground close to farmworkers residences may be made available in which individuals can dig holes and bury refuse. Buried materials should be covered with several inches of soil to prevent fly breeding and discourage rats.

2. Community methods.

a. A well managed landfill, where trucks dump waste and a bulldozer spreads and covers each day's collections with soil is a highly satisfactory method of disposal.

b. Incinerators. Many large incinerators are still in use. Although these provide a sanitary way of waste disposal, they contribute to air pollution and, in some areas, their use is unlawful. Improved designs may eliminate significant air pollution.

c. Open dumps. These provide places for breeding of enormous numbers of flies and rodents and are not only entirely unsatisfactory, but illegal in most places. They are a definite health, accident, and fire hazard.

IV. What to Look for When Checking Solid Waste Sanitation.

A. Is the waste, at the point of origin, stored in such a way that insects and small animals cannot get to it?

B. Is the waste stored so that it does not litter the ground and create a health nuisance?

C. Does the collection service (if any) leave the containers and storage area clean (no scattered waste)?

D. Are containers kept clean enough to prevent fly breeding?

E. Is it collected at least twice weekly?

F. Are the collection trucks clean and made to prevent spillage (covered) of waste and leakage of liquid garbage?

G. Is a regular collection followed? Do the residents know this schedule and are they informed when it is changed?

H. Is there local burning of waste?

I. Is provision made for removal of oversize discards and where do they go?

J. Are there open dumps and are they near the resident area?

K. Is responsibility for solid waste sanitation assigned to one or more individuals and do they understand the importance of this job?

L. Is there a plan for collections in case of an emergency?

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Module X: Disease & Vestor Control

Prepared by:

Dr. Eldon P. Savage

I. Introduction

A. Man has always been bothered by insects such as flies and mosquitoes which annoy or bite him and by rodents such as rats or mice which consume his food.

B. Not until late in the last century did arthropods come to be known as carriers (vectors) of disease. (Texas cattle fever by tick; malaria by mosquitoes.) Later rodents were implicated.

II. Classification of important insects and their relatives which annoy man or spread disease

A. All included in a big group popularly called "bugs" (arthropods).

1. Characteristics: All have a hard shell or skeleton on the outside of the body which is shed several times during growth, a body divided into a series of segments, some of which bear jointed appendages (legs).

B. The insects.

1. Characteristics of adults: Three body divisions, a head which has one pair of antennae ("feelers"), a thorax (roughly corresponds to our chest) which has three pair of legs and often one or two pairs of wings, and an abdomen which usually has no obvious appendages.

2. Types of development.

a. With three life stages (like a cockroach) egg, nymph (which looks like an adult without wings) and adult (often winged).

b. With four life stages (life a fly) egg, larva (which is worm-like and doesn't look like an adult), pupa (a resting, non-feeding stage) and adult. Growth is in nymph and larval stages, not the adult.

3. Important groups of insects.

a. Cockroaches and their relatives: Three life stages, two pair of wings, chewing mouth parts.

b. Sucking lice: Three life stages, wingless, sucking mouth parts, flattened from top to bottom suck blood.

c. True bugs (such as bedbug): Three life stages, two pair of wings (or wingless), sucking mouth parts.

d. Flies, mosquitoes and gnats: Four life stages, one pair of membrane-like wings, sucking mouth parts as adults.

e. Fleas: Four life stages, wingless, sucking mouth parts as adults, flattened from side to side, suck blood, good jumpers.

f. Ants, bees and wasps: Four life stages, two pair of membrane-like wings, chewing mouth parts, often live in colonies, often bite or sting.

C. Spiders, ticks and mites.

1. Characteristics: Two body divisions, a combined head and thorax which has no antennae (feelers), four pairs of legs (sometimes three pairs when first hatched) and no wings, and an abdomen.

2. Development: Similar to three-stage type of insect development (egg, nymph and adult).

III. Ways in which various groups of insects and their relatives are important in migrant labor camps

A. Cockroaches.

1. Live in kitchen and dining areas where they get into food.
2. Since they also get into sewers and privies they may carry disease germs that cause diarrhea and certain other diseases.

B. Sucking lice.

1. Suck blood and cause itching of skin.
2. Can spread typhus, a disease now almost unknown in the United States but formerly very important, especially during wars.

C. True bugs.

1. Bedbugs and a few other bugs cause painful bites which produce itching.

D. Flies, mosquitoes and gnats.

1. Houseflies are annoying while mosquitoes and gnats produce bites which itch.
2. Flies may spread diarrhea or typhoid fever by carrying germs from privies to food or to a person's hands or lips.
3. Mosquitoes, by their bites, spread the germs of a number of diseases including malaria and four kinds of encephalitis (sleeping sickness) sometimes found in the United States.

4. Biting flies, deer flies, black flies, house flies and stable flies may be a problem in migrant labor camps.

E. Fleas.

1. Dogs, cats and rodents are commonly bitten by fleas and often these same kinds of fleas bite people.
2. A few cases of plague, a very serious disease in man, are caused nearly every year in the western United States by bites of wild rodent fleas. Domestic rat fleas also spread murine typhus, a disease still known in the southern and southwestern states, particularly Texas.

F. Ants, bees and wasps.

1. Ants often enter houses and get into food.
2. Many ants bite and some species of ants, as well as bees and wasps, produce painful stings which make a few people very sick.
3. Some people are allergic to stings of wasps and become severly ill when they are stung by them.

G. Spiders, ticks and mites.

1. Spiders are mostly harmless to man but two species, the black widow spider and the brown recluse spider, produce poisonous bites which require the prompt attention of a medical doctor.
2. Ticks commonly bite man and some may spread serious diseases, such as Rocky Mountain spotted fever, which is more common in eastern and southeastern states, than in western United States.

3. Mites may produce bites that are very irritating (for example-chiggers) but they rarely spread disease in the United States.

Audiovisuals:

Slides or film strips of Arthropods of Public Health Importance.

IV. Control of Insects and their relatives

A. Various control methods, in general.

1. Sanitary handling of human waste, animal manure and garbage, including providing privies or flush toilets, spreading manure on fields or hauling away, and providing garbage cans with tight lids which are emptied at least twice a week prevents flies from completing their life cycle of egg-larva-pupa-adult.
2. Screening or air conditioning of all homes, dormitories, dining areas, kitchens and privies to exclude flies, mosquitoes and other insects.
3. Preventing breeding of pests and vectors, through adequate disposal of garbage where flies breed; and eliminating standing water in pools, in old tires, and in artifical containers such as tin cans and bottles where mosquitoes breed.
4. Use of pesticides including repellants applied to skin or clothing, and insecticides applied to breeding areas to kill immature stages of insects, such as those sprayed on pools and drainage ditches where mosquitoes breed, and those applied to the exteriors or interiors of homes and other buildings.

B. Controls of specific groups of insects and their relatives.

1. Cockroaches - sanitation and insecticides.

2. Sucking lice - bodily cleanliness and insecticides applied to body and clothing.
3. Bedbugs - insecticides applied in sleeping areas or fumigating entire buildings by trained pest control operators.
4. Flies and mosquitoes - elimination of breeding sites, screening and insecticides.
5. Fleas - insecticides, usually applied to animals on which they feed and to animal sleeping quarters, nests and burrows.
6. Ants, bees and wasps - insecticides and (for bees and wasps) screening.
7. Spiders, ticks and mites - insecticides occasionally used (such as to spray grass and shrubs near homes in areas heavily infested with ticks or to spray rooms infested with dog ticks), use of protective clothing sprayed with the repellants when going into areas infested with ticks or mites.

V. Kinds of rodents and their importance in labor camps

A. Domestic rats

1. Norway rats (also called brown rat, house rat and sewer rat) is the largest of the domestic rodents and is very common in cities and rural areas of most states. It nests mostly in burrows in the ground.
2. Roof rat is smaller than the Norway rat. It is a climber and nests largely in buildings and trees. It is found mostly in the southern and southwestern states.

3. Both kinds of rats eat and contaminate food. Their gnawing damages buildings and may even cause fires by destroying the insulation on electric wires. Rats spread a number of diseases to man. Babies and helpless people are sometimes seriously bitten and even killed by rats.

B. House Mouse is small, common pest that nearly everyone recognizes. It is found all over the United States where it nests mostly indoors. It eats and dirties food and occasionally may spread disease.

C. Field rodents such as ground squirrels and prairie dogs may be a threat when their burrows are beside labor camps, because they and their fleas are carriers of the disease, plague. Warn everyone, particularly children, not to handle wild rodents, dead or alive.

VI. Rodent control

A. Rat-proof buildings - It is possible to construct dwellings and other buildings in such a way that rats are kept out; or to make older buildings rat proof by plugging holes around pipes, nailing hardward cloth screening around holes, etc.

B. Sanitation - The following procedures will help a great deal to prevent trouble with rats and mice:

1. Storing garbage and other refuse in tight cans.
2. Storing bulk food materials such as flour or sugar so that rodents can't reach them.

3. Collecting garbage twice a week and other refuse once a week and disposal of these in a sanitary landfill or by another approved method.

C. Rodent killing - A number of killing methods help get rid of rodents. (Always use insecticides to kill rodent fleas and other parasites before killing rodents to reduce the risk of their biting man and possibly spreading disease.)

1. Poison baits are probably the most effective. The safest are anticoagulant baits, such as warfarin, which when eaten repeatedly, cause rats to bleed to death internally. When properly used, these baits are not a threat to humans or pets. Red squill baits are also safe to use.

2. Trapping is an effective way to control rodents in certain situations.

Audiovisuals

Film #M-1574 "Recognition of Domestic Rat Signs"

VII. Other animals

A. Dogs

1. Pet dogs should be tied up or fenced to reduce the chances of their getting rabies from wild animals or stray pets.

2. Stray dogs may carry rabies and should be reported to the county or city authorities so that they may be picked up.

3. Dogs should be vaccinated against rabies.

B. Wild animals

1. Animals such as skunks, foxes, and bats are common carriers of rabies and should be strictly left alone. For example, a bat that can't fly may be interesting to a curious child but could give a bite that could cause the child's death unless anti-rabies treatment was given.
2. Wild rabbits often have the disease tularemia which can be transmitted to man while skining and dressing animals to eat.

VIII. Safe use of pesticides to kill insects and rodents.

A. Many pesticides can be used safely only by trained operators.

B. Some such as those contained in aerosol spray cans, can be used safely by untrained people if the directions on the container are carefully followed.

C. Consult with local health or environmental protection authorities to get information on the best pesticides to use and how to use them safely.

D. Farm workers should be cautious about entering fields to harvest crops that have been treated recently with pesticides. Observe safety regulations by being sure that the last application was made long enough to advance for the residue to have become harmless to the worker.

IX. Garbage and trash.

A. The storage, collection and disposal of refuse (garbage and waste paper, tin cans and other trash) can be done in a way to reduce insect and rodent problems.

B. Preparation of garbage for storage:

1. Drain garbage and wrap it in paper to reduce fly breeding and to help keep garbage cans clean.

C. Storage

1. Standard garbage containers made of galvanized metal or plastics with tight-fitting lids, or plastic cap, provide a good way to store refuse until it is picked up for disposal. Washing garbage containers frequently will reduce fly breeding.
2. Large bulk containers which will serve a group of dwellings and which are handled by special trucks for dumping may be used.

D. Collection.

1. Counties, cities, and towns usually provide refuse pick-up services in special trucks.
2. Refuse should be picked up twice a week in warm weather, to prevent the fly life cycle-egg-larvae-pupa and adult.

E. Disposal.

1. Individual methods - If no community pick-up service is provided, single families or groups of neighbors may have to dispose of refuse as best they can.
   a. Backyard burning - This is the least satisfactory method of disposal, because materials are not completely burned and and flies lay eggs in the unburned material and these hatch into larvae, develop into pupa and finally adults. Rats and and mice need very little food and can feed on what is left. Backyard burning also causes air pollution problems.

b. Burying - A plot of ground beside a migrant labor camp may be made available in which individuals can dig holes with a shovel and bury refuse. Buried materials should be covered with several inches (6" daily-2 feet final) of soil to prevent fly breeding and discourage rats.

2. Community methods.

a. Sanitary landfill - A well-handled landfill, where trucks dump refuse and a bulldozer spreads and covers each day's collections with soil is a highly satisfactory method of disposal.

b. Incinerators - Many large incinerators are still in use. Although these provide a sanitary way of refuse disposal, they contribute to air pollution and, in some areas, their use is unlawful. Improved designs may eliminate significant air polution.

Audiovisuals

Landfill slides

Suggested Handouts

1. Bjornson, Pratt and Littig - Control of Domestic Rats and Mice (also in Spanish).
2. Pratt and Littig - Introduction to Arthropods of Public Health Importance (also in Spanish).
3. Pratt, Stojanovich and Rice - Arthropods of Public Health Importance.

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Module XI: Pesticides--Use & Accident Prevention

Prepared by:

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I. Definition: Poison - is a term used to describe those materials or chemicals that are harmful to the body.

A. Toxicity - is a term used in comparing one chemical with another.

B. Hazard or Harmful - a term often used to describe the toxic effects on a biologic species. For example, a chemical may kill a mosquito, but be harmless to man. (Place on blackboard)

Dose: Some chemicals produce death in small doses, and are extremely toxic. On the other hand, other chemicals may be relatively harmless. The size of the dose is probably the most important single item in determining safety of a given chemical.

Routes of exposure: People are exposed to chemicals by three major routes.

1. The major routes being oral (mouth)(skin), and respiratory (breathing). The simplest and most common route of exposure is through skin exposure.
2. Respiratory route: Exposure of man to pesticides through the respiratory route are important in field workers. Pesticides that reach the lung must be so tiny that they will not be removed in the airways of the lungs.
3. Oral route: The oral route is probably the third most common route by which a chemical enters the body. People working with pesticides can be exposed to the pesticide by smoking cigarettes that are contaminated with the material.

LD_{50}

The ill effects that man experiences from the use and misuse of chemicals are related to the toxicity of the compound and man's exposure to the compounds. The range of toxicity of chemical compounds varies significantly. The simplest way of expressing the toxicity of a compound is by means of an LD_{50}-value. Such a value is an estimate of the size of the dosage necessary to kill 50 percent of a population of the test species under stated conditions.

Categories of Toxicity

Categories of toxicity may be devised based on the amount of the chemicals necessary to produce harm. An example of this is:

1. Extremely toxic (a pinch)
2. Moderately toxic (a teaspoon to tablespoon)
3. Relatively harmless (½ cup or more)

II. Pesticides

This group of chemicals includes materials used to control insects, plants, rats and others.

The chemicals used to control insects are called insecticides and include the chlorinated hydrocarbons, and the organophosphates, among others. The organophosphates which includes parathion dysyston, and Guthion are extremely important from an acute pesticide poisoning standpoint in migrants.

The chlorinated hydrocarbon insecticides, such as DDT, Chlordane, etc., act on the central nervous system, but the exact mechanism

of this action either in man or in animals is not known. Large doses also induce nausea and/or diarrhea. On repeated dosage, they may produce changes in the liver and kidneys in some test animals.

The compounds may be stored in the fat of people. Such storage results either from a single large dose or from repeated small doses.

In monitoring studies conducted in the United States, it has been found that people in the northern U.S. store about twice as much DDT as those living in the southern U.S., and non-whites store about twice as much as whites.

Acute oral (mouth) and dermal (skin) LD_{50}-values of selected chlorinated hydrocarbon insecticides for male and female white rats are:

Compound	Oral LD_{50} (mg/kg)		Dermal LD_{50} (mg/kg)	
	Males	Females	Males	Females
Aldrin	39	60	98	98
Chlordane	335	430	840	690
DDT	113	118	-	2510
Dieldrin	46	46	90	60
Dilan	-	-	6900	5900
Endrin	17.8	7.5	-	15

Parathion, methyl parathion, and paraquat typify certain organophosphate insecticides and a herbicide, respectively, which, although they are very effective when used properly for the purposes for which they are intended, can cause acute illness to the user.

Parathion and methyl parathion are highly toxic derivatives of phosphoric acid which were developed during World War II, as a result of the search for effective war gases. Parathion and methyl parathion are the best known and probably the most extensively used organophosphate compounds for crop pest control, and have contributed significantly to high yields of crops.

The organophosphate insecticides differ widely in their inherent toxicity, and to some extent in their rate of absorption. These compounds are absorbed (go through) through the skin, as well as by the respiratory and gastrointestinal tracts.

Absorption by the skin tends to be slow, but because the insecticides are generally difficult to remove, absorption is often prolonged. High outside temperatures increase skin absorption, which is also much greater where there is dermatitis, cuts, or abrasions.

Parathion and methyl parathion are among the more toxic organophosphate insecticides. The dermal LD_{50} values for parathion (male and female white rats) is 21 and 6.8 mg/kg; oral LD_{50} values 13 and 3.6 mg/kg, respectively. Methyl parathion is slightly less toxic, vis., dermal LD_{50} 67 mg/kg and oral LD_{50} 14 to 24 mg/kg.

According to Hayes, signs and symptoms of poisonings include: headache, giddiness, nervousness, blurred vision, weakness, nausea, cramps, diarrhea, and discomfort in the chest.

Signs include: sweating, miosis, tearing, salivation and other excessive respiratory tract secretion, vomiting, cyanosis, papilledema, uncontrollable muscle twitches, convulsions, coma, loss of reflexes, and loss of sphincter control. The last four signs are seen only in advanced cases but do preclude a favorable outcome if energetic treatment is continued.

The most valuable laboratory aid in the diagnosis of acute organophosphate poisoning is the cholinesterase determination. This value can be particularly useful when it can be compared to pre-exposure values. The extent of decline in enzyme activity is an important factor in evaluating the patient's symptomatology.

Following a large oral dose associated with murder or suicide, death has occurred in 5 minutes or less after injection. Following smaller doses swallowed accidentally, illness was sometimes delayed an hour or more. In occupational cases, illness may be delayed several hours so that the worker may first become sick at home after supper. (If symptoms begin more than 12 hours after the last known exposure the illness is probably due to some other cause.) In occupational cases, other symptoms of nausea, cramps, discomfort in the chest, muscular twitching, often follow the initial giddiness, blurred vision, and headache only after a period of 2 to 8 hours, but the onset of serious symptoms may be more rapid.

Treatment of organic phosphate poisoning ranges from removal from exposure in mild cases to the provision of very rigorous supportive and antidotal measures in severe cases. In the moderate to severe case, because of lung involvement, there may be need for artificial respiration using a positive-pressure method. Careful attention must be paid to removal of secretions and to keep the breathing airway open. In severe cases, artificial respiration may be necessary, but the patient should be gotten to a hospital as soon as possible.

Paraquat is registered for use as a herbicide and harvest aid in a wide variety of crop production situations and non-crop areas. Paraquat may be absorbed following oral ingestion, skin exposure or breathing of spray mists. The amount of paraquat ion which would cause death in man following a single oral dose has been estimated as 3 to 6 grams (a small amount).

Swallowing concentrated solutions of paraquat will cause severe irritation to the lining of the mouth, esophagus and stomach. This may be followed by sores in the affected tissues. There is usually vomiting and, after large doses, restlessness and hyper-excitability. Paraquat has a specific and delayed effect upon the lungs, similar to that in pneumonia. Deaths due to these changes have been reported to occur as long as 20 days after

ingestion of a fatal dose. Skin contact with the concentrate may cause severe skin sores and burning. Nail damage from direct contact has been reported which is characterized by disturbed growth. Liquid or dust of paraquat may result in skin and/or eye irritation. Exposure to spray mists may cause the following symptoms: skin sores, nose bleed, mouth sores and upper respiratory tract, cough, chest pain, asthmatic attacks, headache, vomiting and pain and swelling of the joints.

First Aid. A patient poisoned by paraquat should be transferred to a physician immediately. There is no known antidote for paraquat poisoning. If paraquat has been swallowed, vomiting should be induced if it has not already occurred. The stomach should be lavaged with dilute soap solution using care to avoid possible esophageal injury. Give general supportive measures and sedation for hyperexcitability and shock. Maintain high fluid intake and induce diuresis to aid excretion. Keep the patient quiet.

In case of skin contact, remove contaminated clothing and wash skin thoroughly with soap and water. Unless dermal exposure has been very large, the local effects of paraquat require no special treatment beyond the avoidance of further exposure. Healing time of affected skin may be somewhat prolonged. For skin rash, general therapy is suggested.

Maibach found a differential rate of skin absorption for parathion.

Site of Application	Per Cent Absorbed
Forearm	9
Palm	12
Abdomen	19
Back of hand	21
Antecubital Fossa	29
Scalp	32
Back of Ear	34
Forehead	36
Ear Canal	47
Axilla	64
Scrotum	100

Failure to wash properly after exposure. Any person contaminated with a pesticide compound should wash off immediately.

Contaminated soil. Each year 1 or 2 deaths occur because small children eat soil that has been contaminated with a pesticide that has had a concentrated or non-diluted pesticide spilled on it. This A. Pica habit is a term used to describe the fact that some children may want unnatural foods. These may include dirt, paint chips, etc.

Storage and Disposal of Containers

1. Re-use of pesticides containers. Each year accidental poisonings occur through re-use of pesticide containers. In one case two boys played in a 55 gallon drum that had

previously been used to store parathion. The boys filled the empty barrel with water and rolled inside it down an incline on a yard. Both became ill and one lost his life over the incident. In another case a person cooked an evening meal in an insecticide container that had previously been used to store the pesticide Guthion. He also lost his life.

2. Storage in non-original containers. Storage in containers other than the original is probably one of the most serious problems that people face in trying to prevent pesticide poisonings. Each year people are made seriously ill or lose their lives due to the storage of pesticides outside of the original container. Frequently the container is a soft drink bottle. A recent incident in California illustrates this problem. A school principal called the head custodian and told him he needed something to kill weeds that were growing in his lawn. The custodian poured a pesticide called paraquat into a coca cola bottle sitting on his desk. At the same time a boy of high school age was sent to the principal's office because they thought he had been smoking marijuana. Just as the boy entered the principal's office, the principal was called out of his office for a few minutes. When the principal returned he found the boy had drank the contents of the coca cola

bottle, an event that cost him his life. In reconstructing this event it has been theorized that the boy drank the material hoping to remove the odor of marijuana from his breath.

3. Disposal of empty containers. Many farm labor children and others are exposed to pesticides through playing with discarded pesticide containers. These may be where crop dusters have left containers or by playing in trash dumps where used pesticide containers are dumped. All used pesticide containers should be rinsed thoroughly with a detergent prior to disposal. Children should be warned to never play with used pesticide containers. Operators of labor camps should be advised to dispose of pesticide containers in accord with regulations established by health departments in their districts.

Pesticide labeling. A two-year study on the adequacy of pesticide labels, sporsored by the USDA, has revealed how the comprehension and legibility of the labels can be improved.

The study, conducted by communications experts from the University of Illinois, was designed to measure the adequacy of registered pesticide labels and establish guidelines for making the labels more effective in communicating use and precautionary information.

Approximately 350 pesticide labels were analyzed for factors affecting legibility and comprehensibility.

The study revealed that while today's pesticide labels are far from ideal, potential as well as actual pesticide users generally understand most label terms in common use. However, it was found that the reading ease of labels could be improved since only those with at least 10 years of formal education are able to comprehend the average pesticide label.

Suggestions for improving pesticide labels included: improving their legibility; printing precautionary information and directions for use in 11 point type, regardless of label size; using color combinations ranging from black-on-yellow to black-on-white; testing label messages for reading ease; and including information about proper storage and disposal of empty containers.

The Illinois scientists recommended retaining the POISON and DANGER designations along with the skull and crossbones warnings printed in red for highly toxic materials.

Labels. At this point a pesticide label is handed out to each course participant and discussion of the label is held.

III. Kinds of poisons other than pesticides.

A. Drugs - is a term usually used to describe medicines or in making medicines. In a home, common drugs are aspirins, sedatives, heart medicines, cough medicines, nose drops, antiseptics, linaments, etc.

B. Household cleaners - Many of the common household cleaners may be involved in poisonings. These include ammonias, bleaches, drain cleaners, detergents, etc.

C. Fertilizers - may be common in storage areas near field worker housing. These ammonium, nitrate, phosphate and metal salts may cause mild gastric irritation.

D. Gasoline

E. Kerosene

These two compounds may be responsible for burns, ingestions, and fires and are frequently found near storage areas.

F. Other - Other potential poisonings near the home include paints, paint removers, paint thinners, cosmetics, and hobby materials such as taluene in cements, etc.

IV. When - How Poisonings Occur.

A. Home environment - Among articles published since the establishment of the Poison Control Center network are several dealing with the analysis of case reports reporting specifically on the chemical poisoning problem in selected

metropolitan areas. One of these reports was on an analysis of 3,926 cases of accidental poisoning. The age group of five and under accounted for 96% of the cases occuring in children under age 15. Males were reported to be involved in 53% of the cases. Medicinal agents (aspirin, barbiturates, non-barbiturate sedatives, tranquilizers) were the offending agents in 2,152 cases (54.8%). Household preparations such as soaps, detergents and bleach accounted for 561 ingestions (14.3%) followed by pesticides (315 cases - 8%) and a variety of other products.

1. Place in home - The room of the house in which poisoning accidents occured most frequently was the kitchen (40%) followed by the bedroom (22%) and the bathroom (12%). The remaining incidents took place in the basement, living room, garage and other areas.
2. Storage in home - Agents at the time of ingestion are usually stored in the kitchen in the majority of cases, followed by the bedroom, bathroom and other locations. In one-third of the total cases, the chemicals were not found in the original container.
3. Importance of time of day
   a. Meal preparation - Many poisonings occur during meal preparation time.

b. Unattended children - Two scientists have attempted to study the accidental poisoning problem among children. They found three circumstances which occurred singly or in combination that accounted for 86 of the 100 poisonings investigated. In 26 cases, some person other than the parents (siblings, other children, neighbors, relatives, friends) played an important part in the episode. These individuals may have made it possible for the poisoned child to reach the substance, or they may have failed to properly store the chemical. In 31 cases, the parents did not think that the child could climb, open doors, unscrew caps or perform other tasks necessary to obtain the agent. In 53 cases the poison was not in its usual location, either because it was in use, because persons other than the parents had left it out or because the parents themselves were careless. Accidents could be avoided by parents abstaining from taking medicines in front of their children. Children imitate their parents by ingesting chemical substances. It was shown that of the children poisoned by medication other than aspirin, 67% frequently observed their parents taking pills.

B. Camp Environment

Storage of gasoline in improper containers. Fires, burns, and ingestions are 3 things that may happen when either gasoline or kerosene are stored in improper containers. All gasoline containers should be painted red and should be made of non-breakable materials. They should be stored in a safe place where children cannot play with them.

More than 5,000 persons sought hospital emergency room, treatment for injuries associated with gas, kerosene, oil and electric space heaters during 1972. More than 2/3 were treated for burns, and about half the total were children under five years old. At least 12 million American homes use fuel oil space heaters, and it is estimated that up to 700,000 of them have heaters that emit excess carbon monoxide.

With regard to electric heaters, they should have a thermostat control or automatic shut off device. Children should be warned not to put their fingers or objects through the protective guard. Extention cords should not be used for heaters unless they are heavy duty of appropriate wattage. Electic heaters are especially dangerous in bathrooms because of the moisture, direct contact with water and plumbing fixtures.

A burn prevention demonstration project was conducted by the Health Department in Mississippi County, Arkansas. A reporting system of burn injuries was developed through the local hospitals and private physicians' offices and home fires in which injuries resulted were investigated and studied for 15 months. It was learned that the three leading environmental causes involved were misuse of the electrical system in homes, the misuse of petroleum products, and the use of flammable materials such as fiberboard and wallpaper near heating units.

Three hazardous practices (using larger than 15 amp fuses in electric light circuits, adults using kerosene to start fires and storing kerosene and gasoline in glass and other unsafe containers) cause many home fires.

All heating equipment should be inspected and repaired professionally each year. Heaters should be located out of traffic areas and away from furniture, draperies or anything combustible. All persons should be made aware of the hazards from hot surfaces or fire resulting from space heaters.

Injuries from carbon monoxide

1. A car with faulty exhaust system - this is a frequent cause of carbon monoxide poisoning, especially as people travel from low to high altitudes where the vehicles utilize fuel less efficiently and man utilized oxygen less efficiently.

2. A faulty hot water heater - this is a common problem in older homes and vents from hot water heaters may become faulty after repairs are made.

3. A faulty flue - this flue should be repaired. A leading cause of carbon monoxide poisoning in substandard housing is from clogged or faulty flues like the one shown.

4. Inadequate wiring -
    a. lights dim when appliances go on
    b. motors slow down
    c. fuses blow frequently
    d. toasters fail to heat properly
    e. the T.V. picture shrinks
    f. there are not enough outlets

5. Electric cord safety hints -

   a. don't use frayed cords

   b. don't wrap cords around a steam pipe

   c. don't pull cords to disconnect

   d. don't place cords where they will get tripped over

6. Miscellaneous items in the environment that cause accidental injury. These are nails or other sharp objects that cause puncture wounds. Plastic bags that cause suffocation when used in cribs or when played with. The failure to remove old doors from refrigerators.

7. An abandoned vehicle - these vehicles are frequently the cause of injuries due to broken glass or sharp objects.

INFORMATIONAL BOOKLET

on

P E S T I C I D E S

prepared

by

MIGRANT
LEGAL
ACTION
PROGRAM

AUGUST, 1975

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I. ACKNOWLEDGEMENT AND DISCLAIMER

This booklet is the result of the concern by Migrant Legal Action Program (MLAP) in recognizing the need for the preparation and dissemination of information on a dangerous, little known product -- PESTICIDES.

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II. GLOSSARY

ACETYLCHOLINE - an alkaline organic compound prepared from ergot (rye fungus), and used medicinally to decrease the blood pressure or to set up peristalsis (intestinal movements).

ATROPINE - a poisonous cystalline alkaloid obtained from belladonna and other solanaceous plants (nightshade family of plants), which prevents the response of various body structures to certain types of nerve stimulation. Used in treating cases of poisoning by organophosphates and carbamates.

ACTIVATOR - materials used in a pesticide formulation to increase the effectiveness of the toxic materials.

ACTIVE INGREDIENT - the actual toxic materials present in a formulation.

ACUTE ORAL LD_{50} - in toxicity studies it is the dosage required to kill 50% of the test animals when given a single dosage by mouth or skin contact. The dose is expressed by the weight of the chemical per unit of body weight. In this manual LD_{50} toxicities are expressed as oral and dermal toxicities to rats unless otherwise stated.

ADHESIVE - a substance that will cause a spray material to stick to the sprayed surface, E.G. sticking agent.

GLOSSARY Cont'd..

CARRIER - a liquid or solid material added to a chemical diluting its concentration.

COMPATIBILITY - refers to chemical materials that can be mixed together without adversely changing their effects on pests or plants.

CONCENTRATION - the amount of active material in a given amount of substance. The rest is made up of diluent or carrier.

CONTACT INSECTICIDE - a compound that causes death of an insect when it touches its external parts. It doesn't need to be ingested to be effective.

CONTROL - the process of limiting infestations of a pest below a point where great losses to the producer will occur.

CYANOSIS - blueness or lividness of the skin as from imperfectly oxygenated blood.

DERMAL TOXICITY - measures the amount of a poisonous compoun that can be absorbed through the skin of animals to produce toxic symptoms.

DILUENT - a liquid or solid used to carry the active ingredient, e.g. carrier.

DRIFT - the movement of material outside the the intended target area.

GLOSSARY cont'd..

ESTER - a compound formed by the reaction between an acid and an alcohol with the elimination of a molecule of water.

FUMIGANT - any material that destroys organisms when it is in the gas or vapor form.

GASTROENTERITIS - inflamation of the stomach and intestines.

HEAT STROKE - collapse or fever caused by excessive heat.

HERBICIDE - a chemical used to kill or inhibit.

HYDROCARBONS - compounds that contain carbon and hydrogen only.

HYPOGLYCEMIA - abnormal decrease of sugar in the blood.

INGESTED - taken into the digestive system.

INSECTICIDE - a chemical used to kill insects.

LD_{50} - Is the term used to express the toxicity of a compound. It is the amount of actual chemical necessary to kill 50% of the test population. Less variation is encountered by attempting to kill 50% than testing for 1% or 100%. Orally is by having the test animals consume the chemical, and dermally is by having the test animals exposed through skin contact. The smaller the LD_{50}, the more toxic is the chemical. When the toxicity of two or more chemicals are compared, the one with the smaller LD_{50} is the more toxic.

GLOSSARY cont'd..

LIPIDS - any group or organic compounds which make up the fats and other esters which have analogous properties.

ORAL TOXICITY - the degree of toxicity of a compound when it is ingested.

PARTS PER MILLION (ppm) - the number of parts by weight or volume of a given compund in one million parts of the final mixture.

PESTICIDE - a compound, usually a chemical or mixture of chemicals, used for the control of any plant or animal organism deemed to be a pest.

PESTICIDE RESIDUE - the remnant of a pesticide or its degradation products which are found on or in a crop after application.

RESIDUE TOLERANCE - the amount of pesticide which scientists have determined may "safely" remain as a residue on or in the food crop without injury to the consumer.

SPHINCTER - a circular band of voluntary or involuntary muscle which encircles an orifice of the body or one of its hollow organs.

SYNAPSIS - the region of contact between processes of two or more nerve cells, across which an impulse passes.

TOLERANCE - the amount of chemical that can legally be on or in the crop at the time it is offered for sale.

GLOSSARY cont'd..

TOXICITY - the degree a given substance injures plants or animals. Toxicity is classified as acute (immediate) or chronic (long term).

WAITING PERIOD - the time interval (days) between application and harvest which will insure conformance with the tolerance.

III. INTRODUCTION TO PESTICIDE POISONING --GENERALLY

Farm work has been called the third most dangerous profession in the United States. One of many factors making farm work dangerous is exposure to pesticides. If the potential hazards of these poisons are not recognized, serious difficulties can result. Most accidents with pesticides can be prevented.

This booklet will deal with three (3) types of pesticides: organophosphates, carbamates, and chlorinated hydrocarbons. Of the three (3) groups, organophosphates are usually considered to be the most hazardous. This is true for several reasons:

1. Many are highly toxic to humans.
2. They are readily absorbed through the skin - poisoning can occur without the material having been breathed in or eaten.
3. They have come into common use recently and their characteristics are not as well known as those of other pesticides.

If a person is suspected of having been poisoned, he should be taken to a doctor or a clinic immediately. In order for the doctor to know how to treat the poisoning, he must know what kind of poison was involved. Take the label or the container with you! The following is a toll free number for the poison control center nearest you 800-492-2414.

Any person who works with pesticides frequently should talk with a doctor about the advisability of having periodic tests for exposure to these poisons. A doctor may also suggest that the person keep a supply of Atropine pills with him. Atropine is useful in treating cases of poisoning by organophosphates and carbamates. It is not useful in treating poisoning by chlorinated hydrocarbons. In no case should Atropine be taken on a regular basis. Use without medical follow-up can hide the symptoms of serious poisoning.

The symptoms of pesticide poisoning can be mistaken for a variety of other problems such as:

- Heat stroke
- Heat exhaustion
- Hypoglycemia
- Gastroenteritis
- Respiratory infection
- Asthma
- Brain hemorrhage

The probability that the symptoms indicate poisoning is greatly increased if several of the following factors are present:

1. The person is known to have been exposed.
2. If the exposure to the pesticide was fewer than twelve hours before the symptoms developed.
3. Several of the symptoms listed below appeared together.
4. Several persons were exposed in a similar fashion and developed the same symptoms.
5. Exposure was to an organophosphate or to a carbamate and the person was given Atropine by a doctor and showed improvement.

Of course the connection is certain if tests are performed and the following is true:

1. Tests showed a marked decrease in cholinesterase activity.
2. Tests showed that the chemical was present in the body at an excessive level.

Unfortunately test results sometimes take several days to obtain. The cholinesterase activity test may not indicate a problem if exposure was to a carbamate and will not show anything if exposure was to a chlorinated hydrocarbon.

IV. EMERGENCY TREATMENT

If a person is seriously poisoned by a pesticide, rapid emergency treatment can save his life. Get the person to a doctor and take the label of the pesticide with you. If it is impossible to get medical aid, you may be able to help the victim as follows:

1. Remove him from the contaminated area.
2. If he has been poisoned by eating contaminated food and is conscious, get him to vomit (fingers down the throat).
3. If he has been poisoned by an organophosphate or a carbamate, and if Atropine tables are available, give him tablets at the dosage recommended by your doctor.

4. Take off all his clothing - wash him completely with soap and water, including hair.

5. If he is unconscious make sure he has nothing blocking his throat.

6. Give artificial respiration if he is unconscious and has trouble breathing.

V. TYPES OF PESTICIDES

A. Chlorinated Hydrocarbon Insecticides

The chlorinated hydrocarbon insecticides have been widely used since about 1945. Chlorinated hydrocarbons are insoluble in water but soluble in fats and lipids. As a result some of these compounds are stored in fatty tissue when ingested by humans and animals. This is the basis for concern over ecological magnification when some of these compounds are introduced into aquatic food chains.

Some common Chlorinated Hydrocarbons are:

1. Chlordane
2. Chlorobenzilate
3. Dichloro-diphenyl dichloroenthane

Cont'd. Some common Chlorinated Hydrocarbons ..

4. Dieldrin
5. Endosulfan
6. Endrin
*7. Kepone
8. Methoxychlor

B. The Organic Phosphate Insecticides

Organic phosphates have a wide range of insecticidal effectiveness. They are contact insecticides. Many have fuming action.

The organic phosphates act as inhibitors of the enzyme cholinesterase. Often the effect is not immediate and a worker may be exposed to the poison on successive days without apparent ill effects. However, grave symptoms appear when the enzyme level is critically lowered. The hazards of using the phosphates vary widely, depending upon the particular compound.

The phosphates as a whole do not have long residual action.

•Some common Organophosphates are:

*1.	Bidrin	*12.	Guthion
2.	Ciodrin	13.	Malation
3.	Demeton	14.	Mevinphos
4.	Diazinon	*15.	Parathion
5.	Dicapthon	16.	Phorate
6.	Diomethoate	*17.	Phosalone
7.	Dioxathion	18.	Phosphamidon
8.	Disulfoton	19.	Pyrethrins
*9.	EPN	20.	TEPP
*10.	Ethion	21.	Toxaphene
11.	Fenthion	22.	Trichlorfon

C. The Carbamate Insecticides

The carbamate insecticides, like the organophosphorous insecticides, are very active inhibitors of the enzyme, cholinesterase, a vital component of the neuromuscular system of insects. The carbamates act by contact or stomach poisoning and are not fumigants or vapor toxicants.

Some common Carbamates:

1. Baygon
2. Bux
3. Carbaryl
4. Carbofuran
5. Methomyl
6. Zectran

* These pesticides are particularly toxic.

VI. CIRCUMSTANCES LEADING TO PESTICIDE POISONING

There are many circumstances which are associated with pesticide poisoning. Some of the most common are:

1. Transfer of pesticide to unmarked container. Many deaths have occured when children drank a pesticide from a pop bottle.

2. Failure to use protective clothing: long pants, shirt, respirator, etc. - Exposure by skin contact is particularly dangerous with organophosphates.

3. Smoking in field - contamination of cigarettes. With some products the toxicity of the pesticide is greatly increased by burning. A pesticide mist can become dangerous when inhaled through a cigarette.

4. Eating food carried into the field.

5. Failure to shower after exposure, or to change clothes, or wear the same clothes several days in field - clothing becomes very contaminated (especially a problem with organophosphates).

6. Drift Problems - wind change - or wind too high. This is one of the most difficult problems to eliminate especially in the case of a rapid wind change.

7. Pesticide and/or equipment left in unlocked shed - especially dangerous to the curious child.

8. Mixing different pesticides can cause serious problems - Read cautions as to <u>compatibility</u> on label.

9. Disposal of containers - should be discarded according to instructions - frequently can contaminate water supply. Some containers should not be burned (see label). Remember, the container may have residues of the pesticide in its most concentrate form.

10. Using mouth to start syphon of pesticide for transfer from one container to another.

11. Reentry into a field recently sprayed with a pesticide. Check label for legal reentry times - for many organophosphates there is a minimum reentry time of from 24 to 48 hours, and some require three weeks.

12. Mistaken pesticide - if pesticides are not kept in the original container or if the label is removed, serious problems can result. A highly toxic pesticide can be mistaken for a less dangerous one. Consequently, the product will be applied incorrectly with disastrous results for workers.

VII. SYMPTOMS AND FIRST AID ANTIDOTES OF PESTICIDE POISONING

Many organic insecticides have been developed in recent years. It is estimated that of the organo-chlorine group alone, approximately 10,000 compounds are known which have reasonably good insecticidal properties. In addition, there are special formulations designed for specific purposes, mixtures of basic chemicals in many formulations, and numerous name brands which all add to the user's confusion.

It is important to remember that the mode of action and toxicology are different for each insecticide in question. However, certain general facts concerning toxicity can be made and should be kept in mind when using these chemicals.

Measuring Toxicity

First, the degree of toxicity is indicated from experimental tests with animals such as rabbits and rats. The toxicity is expressed in terms of LD_{50}, meaning the amount needed to kill 50% of the test animals. In general, the smaller the LD_{50}, the more hazardous the chemical is.

A. Organophosphate Insecticides

Their action is to lower the cholinesterase enzyme level of the body. When this level is critically reduced, organophosphate poisoning results. Repeated exposure to even small amounts, lowers the cholinesterase level so that further contact with a very small amount of phosphate insecticide may be enough to cause serious danger.

Skin absorption tends to be slow, but because insecticides are difficult to remove, such absorption is frequently prolonged. Skin absorption is somewhat greater at high temperatures and is much greater in the presence of dermatitis. Thus, dermatitis may lead to serious poisoning following exposure that would ordinarily cause no inconvenience.

(Examples)

Bidrin	Phosdrin
Delnav	Phosphamidon
Di-Syston	Systox
Diazinon	TEPP
Dibrom	Thimet
Paration	Trithion

Physiological Action

Inhibits cholinesterase, allowing accumulation of acetylcholine at synapsis throughout the nervous system.

Symptoms and Signs

(1) The usual symptoms include headache, giddiness, blurred vision, weakness, nausea, cramps, diarrhea, and discomfort in the chest. (2) The signs include sweating, miosis, tearing, salivation and other excessive respiratory tract secretions, vomiting, cyanosis, papilledma, uncontrollable muscle twitches, convulsions, coma, loss of reflexes and loss of sphincter control. The last four signs are seen only in advanced cases but do not preclude a favorable outcome if energetic treatment is continued.

In occupational cases, illness is frequently delayed several hours so that the worker may first become sick at home after supper. (However, if symptoms begin more than 12 hours after the last known exposure to insecticide, illness is probably due to some other cause.)

Antidote

Internal - Call physician immediately. Induce vomiting by finger down throat, or tablespoon of salt in glass of warm water. Repeat until vomit fluid is clear. Give plenty of milk or water. Atropine or 2 PAM should only be administered at the advice of a physician.

External - Remove contaminated clothing. Wash with soap and water; flush eyes with water.

Never administer Atropine unless warning symptoms appear.

Treatment

(Prescribed by Dr. Wayland Hayes. Clinical Handbook on Economic Poisons. U. S. Public Health Service 1965.)

Severe Cases

(1) Artificial respiration, preferably with respirator.

(2) After cyanosis disappears: Atropine sulfate, 2 to 4 mg. at 5 to 10 minute intervals until tachycardia up to 140 and other signs of atropinization appear. A large amount may be needed as these patients are abnormally tolerant of Atropine.

(3) 2-PAM, slowly, intravenously; 1 gm. for adults and 0.25 gm. for infants.

(4) Decontaminate skin with soap and water and a mild base such as baking soda. Empty stomach. Irrigate eyes.

(5) Other symptomatic treatment as necessary. Do not use morphine or related drugs.

Mild Cases

(1) Atropine sulfate, 1 to 2 mg. every hour, IV or IM, up to 10 to 20 mg. a day, until symptoms are controlled. Continue Atropine at least 4 hours even in mildest cases.

(2) Decontamination of skin, stomach, and eyes.

(3) 2 -PAM slowly, intravenously, if the patient fails to respond satisfactorily to atropine sulfate. Dose of 1 gm. for adults, 0.25 gm for infants.

(4) Symptomatic treatment.

Arsenicals

Calcium arsenate
Lead arsenate
Paris green
Sodium arsenate

Antidote

Internal - Call physician immediately. Give a tablespoonful of salt in a glass of warm water and repeat until vomit fluid is clear; then, give 2 tablespoons of Epsom Salts or Milk of Magnesia in water and plenty of milk or water. Have the victim lie down and keep quiet. Keep warm, use external heat (blankets, hot water bottle, etc.)

External - Wash contaminated skin with soap and water; flush eyes thoroughly with water.

Fumigants

Carbon disulfide	EB-5
Carbon tetrachloride	Methyl bromide
Chloropicrin	Nemagon
Dowfume W-85	Vapam .

Antidote

Call physician immediately. Remove victim immediately from contaminated atmosphere. Quickly remove any contaminated clothing. Give artificial respiration if breathing has stopped. Keep victim lying down and warm.

Observe These Precautions

1. Always read the label before using insecticides. Note ingredients, uses, directions, warnings and cautions each time before opening the container.

2. Keep all insecticides out of the reach of children, pets, and irresponsible people.

3. Always store insecticides in the original containers and keep them tightly closed.

4. Never smoke or eat while spraying or dusting.

5. Avoid inhaling sprays or dusts. When directed on the label, wear protective clothing and masks.

6. Do not spill sprays or dusts on the skin or clothing. If they are spilled, remove contaminated clothing immediately and wash thoroughly.

7. Wash hands and face and change to clean clothing after spraying or dusting. Also wash clothing each day before reuse.

8. Cover food and water containers when treating around livestock or pet areas. Do not contaminate fish ponds.

9. Use separate sprayers for applying herbicides in order to avoid accidental injury to susceptible plants.

10. Always dispose of empty containers so that they create no hazard to humans, animals, or wildlife.

11. Observe label directions and cautions to keep residues on edible portions of plants within limits permitted by law.

12. If symtoms of illness occur during or shortly after spraying or dusting, call a physician or get the patient to a hospital immediately.

ALWAYS take the container along when contacting a physician. The label on the container often has special directions for treatment

B. Carbamates (Similar to organophosphates).

Carbamates are highly toxic orally and by inhalation. Adequate protective equipment such as respirators must be used with liquid formulations.

The dermal LD_{50} is 850 mg/kg based on technical material. This represents the minimum from skin asorption where ordinary handling precautions are observed.

The mammalion LD_{50} for technical material is 5 mg/kg, for oral doses indicating that the chemical is extremely hazardous if ingested.

Carbamates toxicity include headaches, light headedness, weakness, and nausea followed by constriction of the pupils, blurred vision, excessive salivation, perspiration and vomiting.

Atropine is antidotal for carbamate poisoning. The OXIMS, such as 2-PAM, should not be used.

C. Chlorinated Hydrocarbon Insecticides

The action of the chlorinated hydrocarbon insecticides is on the central nervous system, but the exact mechanism of this action either in man or in animals is not known. Large doses also induce nausea and/or diarrhea. On repeated dosages, the compounds produce microscopic changes in the liver and kidneys in some experimental animals. This has not been demonstrated clearly in man in connection with uncomplicated poisoning.

The compounds and/or certain degradation products are stored in fat. Such storage results either from a single large dose or from repeated small doses. The materials stored in the fat appear to be largely inactive, since the total amount in an experimental animal often may be greater than if the lethal dose were given at one time. The insecticides (or their derivatives) usually may be demonstrated in milk and urine. The compounds stored in the fat are eliminated only very gradually when further dosage is discontinued.

Nervous symptoms and convulsions entirely similar to those of chlorinated hydrocarbon insecticide poisoning may be induced by a variety of economic poisons as well as by even less specific neurologic disease.'

(Examples)

Aldrin	Endrin
BHC	Heptachlor
Chlordane	Lindane
Chlorbenzilate	Methoxychlor
DDT	TDE
Dieldrin	Toxaphene

Physiological Action

Stimulation of central nervous system.

Symptoms and Signs

Headache, nausea, vomiting, malaise, physical discomfort, dizziness, prostration (depression), twitching of muscles, mental confusion or semi-consciousness, loss of appetite.

Antidote

Internal - Call physician immediately. Give a tablespoonful of salt in a glass of warm water and repeat until vomit fluid is clear; then give two (2) tbsp., of Epsom salts of Milk of Magnesia in water and plenty of milk or water. Have the victim lie down and keep quiet.

Keep warm, use external heat (blankets, hot water bottle, etc.)

External - Wash contaminated skin with soap and water; flush eyes with water.

Diagnosis

Largely on history of exposure. Only a very few laboratories can perform the diagnostic test.

Treatment

(Prescribed by Dr. Wayland Hayes. Clinical Handbook on Economic Poisons. U. S. Public Health Service. 1965.)

(1) Barbiturates in sufficient quantity to maintain relative calm. This may be a very large amount, because these patients have increased tolerance (phenobarbital up to 0.7 gm. per day for an adult). Sedation may be necessary for as long as a week.

(2) Empty stomach; decontaminate skin with soap and water.

VIII. THE PESTICIDE LABEL

In addition to the first aid information that the doctor needs, the label has information useful for you. The label will show you how toxic the pesticide is:

1. Highly toxic
   -Skull and crossbones

   -"Danger Poison"

2. Moderately toxic
   - "Warning"

3. Low-order toxicity
   -"Caution"

4. Comparatively free of danger
   -no warning

The importance of reading the label cannot be stressed too often. The information that appears on the label is put there for your information and your protection. If it is read, understood, and all the directions are followed, the likelihood of misusing the material or of having an accident with the pesticide is remote. This is why we so stress that the most important few minutes in pest control is the time spent in reading the label.

The label is a tool. Learn to use it.

A. What is on the Label?

A pesticide label has all of the necessary information and instructions for the safe, effective use of the pesticide. It must, by law, include the following:

- Brand name
- Intended use of product
- Active ingredients
- Inert ingredients
- Directions for use
- Pests to be controlled
- Crops, animals, or sites to be treated
- Dosage, time, and method of application
- Warnings to protect the user, the consumer of treated foods, and beneficial plants and animals
- The statement, "Keep out of reach of children".
- Net contents
- Name and address of manufacturer or registrant
- EPA registration number

B. When you should read the Label

Read the Label to determine:

1. . If this is the chemical for the job. Never purchase or select a pesticide based on the color of the label.

   . Labels of the same color and general make-up may contain widely different active ingredients.

   . Whether this material is too toxic or hazardous to be used safely under your conditions.

   . Concentration in percent or pounds per gallon of active ingredient.

   . If the formulation is suitable for the equipment being used.

2. Before you mix the material, read directions to determine:

- Protective equipment necessary when handling it.
- Warnings and antidotes, when required.
- What you can mix with it (compatibility).
- How to mix it.
- How much to use.

3. Before applying, read directions to determine:

- Safety measures necessary for applicator.
- To what it can be applied.
- When to apply (including waiting period on crops and animals).
- How to apply.
- Rate of application.
- Restrictions of use.
- Special instructions.

4. Before storing or disposing of the pesticide containers, read the directions to determine:

- Where and how to store.
- Where it should not be stored.
- What it should not be stored with.
- How to decontaminate and dispose of the container.
- Where to dispose of left-over pesticides or their containers.

C. Key Words and Symbols on Labels.

Many of the terms used on labels are set by law. Certain "signal words" such as "Danger," "Poison," "Warning," "Caution," and the skull and cross bones symbol are required by law to appear on the label. They indicate the degree of toxicity of the pesticide.

The signal words, "Danger," "Poison," and the skull and cross bones symbol are required on the labels for all highly toxic compounds.

A knowledge of the meaning of the signal words and symbols forewarns the user of potential hazards associated with chemicals.

The label will also tell you:

1. What protective clothes and equipment are required.
2. How soon you can enter a field after it has been sprayed.
3. First aid instructions.

IX. A NOTE ON HERBICIDES

Herbicides tend to be much less toxic to humans than insecticides. However, it should be noted that exposure to herbicides under certain conditions can cause skin rash and other skin problems - sometimes severe. There is also evidence that in extremely high doses the herbicides 2, 4-D and 2, 4, 5-T cause birth defects in mice.

Consequently, herbicides should be considered as potentially hazardous, especially to persons with a history of skin problems and to formulators and mixers who might be exposed to these substances in an undiluted form.

X. PESTICIDE RESIDUES

A pesticide residue is the remnant of a pesticide or its degradation products which are found on or in a crop after application. Residues on a crop may result from either direct application or drift. Residues are usually expressed in parts per million (p.p.m.) on a weight basis.

Example:

- One pound in 1 million pounds.
- One ounce of sand in 31/4 tons of cement.
- One ounce of salt in 62,500 pounds of sugar.
- One ounce of pesticide residue in 1 million ounces of the raw agricultural commodity.

A residue tolerance is simply the amount of a pesticide which scientists have determined may "safely" remain as a residue on or in the food crop without injury to the consumer. The "tolerance" is specific for the pesticide and the crop, and is set by the Federal Food and Drug Administration (FDA).

Tolerances are also established in terms of parts per million (p.p.m.) on a weight basis.

Persistance of compounds

Most pesticides of the chlorinated hydrocarbon group such as DDT, aldrin, dieldrin and endrin are quite persistent while most of the organophosphates such as TEPP are less persistent.

Some factors which influence the persistence of pesticides are:

- The amount of chemical applied. The formulation.
- The pH; i.e., the alkalinity of the diluent used as a carrier.
- The nature of the surface to which it is being applied (crop).
- Exposure to weathering from wind, rain, etc.
- Chemical breakdown from high temperatures and humidity.
- Photochemical reactions from sunlight.
- The length of time the chemical is exposed to the above factors.

Increasing residues

Dehydration. The loss of water from a raw agricultural commodity will usually result in an increase in the percent of whatever residue is present. This is because residues are measured on a weight basis and if water is removed by dehydration, the article becomes lighter, and the ratio of the chemical residue to the commodity changes. In some cases a product may be legal in the raw or green state, but illegal after dehydration.

Combination of chemicals

Combination of certain chemicals can result in excessive residues.

XI. EPA WORKER PROTECTION STANDARDS

Chapter I—Environmental Protection Agency

PART 170—WORKER PROTECTION STANDARDS FOR AGRICULTURAL PESTICIDES

Sec.
170.1 General.
170.2 Definitions.
170.3 General standard.
170.4 State standards, labels and exemptions.
170.5 Warnings.

AUTHORITY: Sec. 25, 86 Stat. 997; 7 U.S.C. 136w.

SOURCE: 39 FR 16890, May 10, 1974, unless otherwise noted.

170.1 General.

This part contains occupational safety and health standards for farm workers performing hand labor operations in fields after ground (other than those incorporated into the soil), aerial or other type of application of pesticides.

170.2 Definitions.

Terms used in this subpart shall have the meanings set forth for such terms in the Act. In addition, as used in this subpart, the following terms shall have the meanings stated below:

(a) The term "reentry time" means the period of time immediately following the application of a pesticide to a field when unprotected workers should not enter as provided for in § 170.3(b).

(b) The term "farm worker" or "worker" means any person or persons engaged in agricultural hand labor in the field.

(c) The term "field" means any treated land area, or part thereof, upon which one or more pesticides are used for agricultural purposes, all as specified by this part.

(d) The term "protective clothing" means at least a hat or other suitable head covering, a long sleeved shirt and long legged trousers or a coverall type garment (all of closely woven fabric covering the body, including arms and legs), shoes and socks.

170.3 General standard.

(a) *Application.* No owner or lessee shall permit the application of a pesticide in such a manner as to directly or through drift expose workers or other persons except those knowingly involved in the application. The area being treated must be vacated by unprotected persons.

(b) *Reentry times.* (1) No owner or lessee shall permit any worker not wearing protective clothing (under § 170.2 (d)) to enter a field treated with pesticides until sprays have dried or dusts have settled, unless exempted from such requirements, or a longer reentry time has been assigned to that pesticide;

(2) Pesticides containing the following active ingredients have a reentry time of at least the interval indicated:

	Hours
(i) Ethyl parathion	48
(ii) Methyl parathion	48
(iii) Guthion	24
(iv) Demeton	48
(v) Azodrin	48
(vi) Phosalone	24
(vii) Carbophenothion	48
(viii) Metasystox-R	48
(ix) EPN	24
(x) Bidrin	48
(xi) Endrin	48
(xii) Ethion	24

(3) The preceding requirements of this part notwithstanding, workers should not be permitted to enter treated fields if special circumstances exist which would lead a reasonable man to conclude that such entry would be unsafe.

170.4 State standards, labels and exemptions.

(a) Nothing herein shall prevent a duly authorized state regulatory agency from setting and enforcing more restrictive standards for workers in fields treated with pesticides.

(b) If the label for a pesticide bears restrictions against workers entering treated fields which are more stringent than those set forth above, the label restrictions shall apply.

(c) The restrictions set forth in this part shall not apply with respect to:

(1) Mosquito abatement treatments and related public pest control programs;

(2) Greenhouse treatments which are applied in accordance with labeling directions and restrictions;

(3) Livestock and other animal treatments which are applied in accordance with labeling directions and restrictions;

(4) Treatment of golf courses and similar non-agricultural areas which are applied in accordance with labeling directions and restrictions.

170.5 Warnings.

(a) When workers are expected to be working in a field treated or to be treated with a pesticide, appropriate and timely warning to such workers shall be given. The warning may be given orally and/or by posting warning signs at the usual points of entrance to the field, and/or on bulletin boards at points where the workers usually assemble for instructions. Where any person has reason to believe that a farm worker is unable to read, he shall give the farm worker oral warning and make reasonable effort to ensure understanding of such warning. When required, warnings shall be given in appropriate languages other than the English language. Oral warnings should be given in such a manner as to inform workers of areas or fields which should not be entered without protective clothing, the period of time the area or field should be vacated and actions to take in case of accidental exposure.

XII. SUGGESTED COURSE OF ACTION ON PESTICIDE POISONING

In any instance of suspected and/or verified pesticide poisoning involving a farmworker, a detailed report should be prepared containing the following information:

1. Time and date of violation.
2. Location of violation site.
3. Individual responsible for violation.
4. Type of pesticide used:
   a) name
   b) active ingredients
   c) EPA registration number
5. Crop pesticide was applied to and for what purpose.
6. Names and addreses of any witnesses.
7. Individuals affected and how they were affected.
8. Immediate first aid and measures taken, medical attention provided, outcome of the treatment.
9. Means by which pesticide was applied -- plane, spray rig, etc.
10. Any other damage caused by violation.

The incident should be reported to the Environmental Protection Agency (EPA) for further investigation. A list of Regional EPA offices is attached. Any information sent to EPA

should be by registered mail only with copy to Migrant Legal Action Program, 1910 K St., N. W. Washington, D. C. 20006.

Should there be a legal services office in your area, contact it in the event legal action is necessary.

WHY IS THIS ACTION NECESSARY?

Although we are concerned with the present label requirements (directions printed only in English), and the storage and disposal of pesticide containers, our most serious concern is the evaluation of the hazard to the farmworker from exposure to pesticides and their residues (data unavailable at present). There is no specific mention in either the appendix or in the regulations (40 C.F.R. Section 170 et seq.) of the acute hazard of exposure to farmworkers from non-cholinesterase inhibiting pesticide or the chronic or long term hazards of exposure to Cholinesterace inhibiting or non-cholinesterase inhibiting pesticide in the regulations, supra. Experts have declined to extrapolate data, which formed the basis for pesticide tolerances regulations desinged to protect consumers, and apply it to the farmworker situation.

Therefore, we must see to it that the need for relevant data is met and to assist and encourange EPA in promulgating regulations to protect the health and well-being of farmworkers.

XIII. APPENDIX A

ENVIRONMENTAL PROTECTION AGENCY

Regional Offices

Send your report to:

Address	States Covered	
Pesticide Branch U.S. Environmental Protection Agency Region I John F. Kennedy Federal Bldg. Boston, Massachusetts 02203	Connecticut Maine Massachusetts	New Hampshire Rhode Island Vermont
Pesticides Branch U.S. Environmental Protection Agency Region II 26 Federal Plaza New York, New York 10007	New Jersey New York Canal Zone	Puerto Rico Virgin Island
Pesticides Branch U.S. Environmental Protection Agency Region III 6th & Walnut Streets Philadelphia, Pennsylvania 19106	Delaware Maryland Pennsylvania	Virginia West Virginia
Pesticides Branch U.S. Environmental Protection Agency Region IV 1421 Peachtree Street, N.W. Atlanta, Georgia 30309	Alabama Florida Georgia Kentucky	Mississippi North Carolina South Carolina Tennessee
Pesticides Branch U.S. Environmental Protection Agency Region V Federal Building 230 So. Dearborn Chicago, Illinois 60604	Illinois Indiana Michigan	Minnesota Ohio Wisconsin
Pesticides Branch U.S. Environmental Protection Agency Region VI 1600 Patterson t. Dallas. Texas 75201	Arkansas Louisiana New Mexico	Oklahoma Texas

Pesticides Branch U.S. Environmental Protection Agency Region VII 1735 Baltimore Ave. Kansas City, Missouri 64108	Iowa Kansas	Missouri Nebraska
Pesticides Branch U. S. Environmental Protection Agency Region VIII 1860 Lincoln St., Suite 900 Denver, Colorado 80203	Colorado Montana North Dakota	South Dakota Utah Wyoming
Pesticides Branch U.S. Environmental Protection Agency Region IX 100 California Street San Francisco, California 94111	Arizona California Hawaii Nevada	American Samoa Guam Trust Territory
Pesticides Branch U.S. Environmental Protection Agency Region X 1200 Sixth Avenue Seattle, Washington 98101	Alaska Idaho	Oregon Washington

APPENDIX B

USEFUL REFERENCE MATERIALS

1. Davies, John E. "Pesticides and the Environment," Boletin de la Oficina Sanitaria Panamericana , English and Spanish, Vol. VI, No. 3, 1972.

2. Gleason, Gosselin, Hodge and Smith. Clinical Toxicology of Commercial Products, Baltimore: Williams and Wilkins, Co., 1975.

3. Juárez Lincoln University, National Farmworker Information Clearinghouse. List of Migrant Health Clinics, free.

4. Merk Index, Rahway, New Jersey: Merk and Co., Inc., 1968 (a new edition will be ready soon).

5. National Institute for Occupational Safety and Health. The Toxic Substance List. Government Printing Office, $8.40.

6. Occupational Safety and Health Administration, Department of Labor, Washington, D. C. 20210 (Series on pesticides in preparation).

7. Schwartz, Joe. "Poisoning Farmworkers," in Environment. June, 1975, Vol. 17, No. 4, pp. 27-33.

8. U. S. Environmental Protection Agency. Clinical Handbook on Economic Poisons, Government Printing Office, EP5. 8:P75, $1.00.

9. U. S. Environmental Protection Agency. "Diagnosis and Treatment of Poisoning by Pesticides."

10. U. S. Public Health Service. "Directory of Poison Control Centers." Available from Government Printing Office.

OCCUPATIONAL SAFETY AND HEALTH

PRACTICE MANUAL

Prepared by:

Migrant Legal Action Program

I. Introduction

The Occupational Safety and Health Act (OSHA) was enacted in order to protect the safety and health of workers. Unlike other legislation, the Act applies to all farmworkers.

Under the Act a standard to protect against a particular Occupational Safety and Health hazard is issued by the Department of Labor. Any employer who violates this standard will be liable for a penalty. Enforcement of the standard is carried out by way of inspection of the workplace by an OSHA inspector. A worker complaint mechanism provides for immediate inspection following a report of an OSHA violation. Otherwise the workplace may be inspected in the course of random inspections by OSHA inspectors.

Following is a more detailed description of these steps, which should provide a model to protect the occupational safety and health of farmworkers.

II. Occupational Safety and Health Standards

A. Pesticide and Housing Standards

It is first necessary to acquaint yourself with the existing Occupational Safety and Health Standards which are applicable to farmworkers. At the present time the only standards which are applicable to farmworkers are those for housing, exposure to pesticides, storage and handling of anhydrous ammonia, pulpwood logging and slow moving vehicles. As the housing and pesticide standards are the only ones generally applicable, they are attached in Appendix A and B. The other standards can be found in 29 CFR Ch. XVII Pt. 1910.111, 1910.266, 1910.145.

At the present time either of two existing standards are applicable to farmworker housing, both printed in the appendix. However, it is likely that the first standard, 20 CRF 620, will be adopted as a final standard with some changes in the next month. The pesticide standard will go into effect in June, 1973, as an emergency standard and will be replaced by a permanent standard six (6) months later.

B. Other Standards

The Migrant Legal Action Program and other petitioners have also requested issuance of field sanitation and farm equipment standards. The farm equipment standard should be issued in the next six (6) months but the issuance of the sanitation standard is likely to take a longer period of time. Any requests you have regarding the issuance of other standards should be directed to our program.

C. Where There is No Existing Standard

If you determine that workers are suffering from an occupational safety and health hazard which is not covered under an existing standard, a complaint should be filed in reference to the General Duty Clause. This clause requires the employer to provide employment and a place of employment free from recognized hazards.

III. Enforcement

A. Filing a Complaint

Any farmworker or representative of the farmworkers should file a complaint with the local area director if he believes that an occupational safety and health standard has been violated or that the addresses of the area Director and Appendix D includes the complaint form.

B. Inspection

Following receipt of a complaint, the area director will either direct that an inspection be made or will inform the complaining party of his determination that no inspection is necessary. The complaining party can appeal this decision to the Regional Administrator who will make the final decision and so inform the complaining party. Appendix E lists the names and addresses of the regional administrators.

C. Retaliation

The Act specifically prohibits any retaliatory acts following the filing of a complaint. The language is sufficient to protect an employee threatened with retaliation.

D. Employer Violations

(1) Determination of violation

Following an inspection, the area director will determine whether or not there is a violation. If he finds a violation, he will issue a citation, sending a copy to both the employer and employee. The employer must post the citation at or near the place of violation or at a prominent place. The citation will fix a reasonable time within which the employer must abate the hazard. A decision that no violation exists can be appealed to the regional administrator whose decision is final.

(2) Penalty for violation

The area director is given a great deal of discretion to determine the penalty for any violation. He shall not propose a penalty for a de minimus violation. However, in regard to any other violation, the following factors will be considered; the size of the business, the gravity of the violation, the good faith of the employer, and the history of previous violations.

(3) Correction of violations for which citation is issued

If the time for abatement of a violation provided in a citation seems too long, an employee or his representative can make a complaint to the area director, within 15 days of receipt of the notice of proposed penalty. The complaint will then be forwarded to the review commission of the Occupational Safety and Health Administration.

Similarly, if the time for abatement of a violation has passed without correction of the hazard, the area director should be notified. He can then assess an additional penalty against the employer.

(4) Employer rights

Any employer can contest any citation or notice of proposed penalty before the review commission.

20 CFR 620 - Housing Standard

§ 620.4 Housing Site.

(a) Housing sites shall be well drained and free from depressions in which water may stagnate. They shall be located where the disposal of sewage is provided in a manner which neither creates nor is likely to create a nuisance, or a hazard to health.

(b) Housing shall not be subject to, or in proximity to conditions that create or are likely to create offensive odors, flies, noise, traffic, or any similar hazards.

(c) Grounds within the housing site shall be free from debris, noxious plants (poison ivy, etc.) and uncontrolled weeds or brush.

(d) The housing site shall provide a space for recreation reasonably related to the size of the facility and the type of occupancy.

§ 620.5 Water supply.

(a) An adequate and convenient supply of water that meets the standards of the State health authority shall be provided.

(b) A cold water tap shall be available within 100 feet of each individual living unit when water is not provided in the unit. Adequate drainage facilities shall be provided for overflow and spillage.

(c) Common drinking cups shall not be permitted.

§ 620.6 Excreta and liquid waste disposal.

(a) Facilities shall be provided and maintained for effective disposal of excreta and liquid waste. Raw or treated liquid waste shall not be discharged or allowed to accumulate on the ground surface.

(b) Where public sewer systems are available, all facilities for disposal of excreta and liquid wastes shall be connected thereto.

(c) Where public sewers are not available, a subsurface septic tank-seepage system or other type of liquid waste treatment and disposal system, privies or portable toilets shall be provided. Any requirements of the State health authority shall be complied with.

§ 620.7 Housing.

(a) Housing shall be structurally sound, in good repair, in a sanitary condition and shall provide protection to the occupants against the elements.

(b) Housing shall have flooring constructed of rigid materials, smooth finished, readily cleanable, and so located as to prevent the entrance of ground and surface water.

(c) The following space requirements shall be provided:

(1) For sleeping purposes only in family units and in dormitory accommodations using single beds, not less than 50 square feet of floor space per occupant;

(2) For sleeping purposes in dormitory accommodations using double bunk beds only, not less than 40 square feet per occupant;

(3) For combined cooking, eating, and sleeping purposes not less than 60 square feet of floor space per occupant.

(d) Housing used for families with one or more children over 5 years of age shall have a room or partitioned sleeping area for the husband and wife. The partition shall be of rigid materials and installed so as to provide reasonable privacy.

(e) Separate sleeping accommodations, shall be provided for each sex or each family.

(f) Adequate and separate arrangements for hanging clothing and storing personal effects for each person or family shall be provided.

(g) At least one-half of the floor area in each living unit shall have a minimum ceiling height of 7 feet. No floor space shall be counted toward minimum requirements where the ceiling height is less than 5 feet.

(h) Each habitable room (not including partitioned areas) shall have at least one window or skylight opening directly to the out-of-doors. The minimum total window or skylight area, including windows in doors, shall equal at least 10 percent of the usable floor area. The total openable area shall equal at least 45 percent of the minimum window or skylight area required, except where comparably adequate ventilation is supplied by mechanical or some other method.

§ 620.8 Screening.

(a) All outside openings shall be protected with screening of not less than 16 mesh.

(b) All screen doors shall be tight fitting, in good repair, and equipped with self-closing devices.

§ 620.9 Heating.

(a) All living quarters and service rooms shall be provided with properly installed, operable heating equipment capable of maintaining a temperature of at least 68° F. if during the period of normal occupancy the temperature in such quarters falls below 68°.

(b) Any stoves or other sources of heat utilizing combustible fuel shall be installed and vented in such a manner as to prevent fire hazards and a dangerous concentration of gases. No portable heaters other than those operated by electricity shall be provided. If a solid or liquid fuel stove is used in a room with wooden, or other combustible slab, insulated metal sheet, or other fireproof material on the floor under each stove, extending at least 18 inches beyond the perimeter of the base of the stove.

(c) Any wall or ceiling within 18 inches of a solid or liquid fuel stove or a stove-pipe shall be of fireproof material. A vented metal collar shall be installed around a stovepipe, or vent passing through a wall, ceiling, floor or roof.

(d) When a heating system has automatic controls, the controls shall be of the type which cut off the fuel supply upon the failure or interruption of the flame or ignition or whenever a predetermined safe temperature or pressure is exceeded.

§ 620.10 Electricity and lighting.

(a) All housing sites shall be provided with electric service.

(b) Each habitable room and all common use rooms, and areas such as: Laundry rooms, toilets, privies, hallways, stairways, etc., shall contain adequate ceiling or wall-type light fixtures. At least one wall-type electrical convenience outlet shall be provided in each individual living room.

(c) Adequate lighting shall be provided for the yard area, and pathways to common use facilities.

(d) All wiring and lighting fixtures shall be installed and maintained in a safe condition.

§ 620.11 Toilets.

(a) Toilets shall be constructed, located and maintained so as to prevent any nuisance or public health hazard.

(b) Water closets or privey seats for each sex shall be in the ratio of not less than one such unit for each 15 occupants, with a minimum of one unit for each sex in common use facilities.

(c) Urinals, constructed of nonabsorbent materials may be substituted for men's toilet seats on the basis of one urinal or 24 inches of trough-type urinal for one toilet seat up to a maximum of one-third of the required toilet seats.

(d) Except in individual family units, separate toilet accommodations for men and women shall be provided. If toilet facilities for men and women are in the same building, they shall be separated by a solid wall from floor to roof or ceiling. Toilets shall be distinctly marked "men" and "women" in English and in the native language of the persons expected to occupy the housing.

(e) Where common use toilet facilities are provided, an adequate and accessible supply of toilet tissue, with holders, shall be furnished.

(f) Common use toilets and privies shall be well lighted and ventilated and shall be clean and sanitary.

(g) Toilet facilities shall be located within 200 feet of each living unit.

(h) Privies shall not be located closer than 50 feet from any living unit or any facility where food is prepared or served.

(i) Privy structures and pits shall be fly tight. Privy pits shall have adequate capacity for the required seats.

§ 620.12 Bathing, laundry, and handwashing.

(a) Bathing and handwashing facilities, supplied with hot and cold water under pressure, shall be provided for the use of all occupants. These facilities shall be clean and sanitary and located within 200 feet of each living unit.

(b) There shall be a minimum of 1 showerhead per 15 persons. Showerheads shall be spaced at least 3 feet apart, with a minimum of 9 square feet of floor space per unit. Adequate, dry dressing space shall be provided in common use facilities. Shower floors shall be constructed of nonabsorbent, nonskid materials and sloped to properly constructed floor drains. Except in individual family units, separate shower facilities shall be provided each sex. When common use shower facilities for both sexes are in the same building they shall be separated by a solid nonabsorbent wall extending from the floor to ceiling, or roof, and shall be plainly designated "men" or "women" in English and in the native language of the persons expected to occupy the housing.

(c) Lavatories or equivalent units shall be provided in a ratio of 1 per 15 persons.

(d) Laundry facilities, supplied with hot and cold water under pressure shall be provided for the use of all occupants. Laundry trays or tubs shall be provided in the ratio of 1 per 25 persons. Mechanical washers may be provided in addition to the mechanical washers.

§ 620.13 Cooking and eating facilities.

(a) When workers or their families are permitted or required to cook in their individual unit, a space shall be provided and equipped for cooking and eating. Such space shall be provided with: (1) a cookstove or hot plate with a minimum of two burners; and (2) adequate food storage shelves and a counter for food preparation; and (3) provisions for mechanical refrigeration of food at a temperature of not more than 45° F.; and (4) a table and chairs or equivalent seating and eating arrangements all commensurate with the capacity of the unit; and (5) adequate lighting and ventilation.

(b) When workers or their families are permitted or required to cook and eat in a common facility, a room or building separate from the sleeping facilities shall be provided for cooking and eating. Such room or building shall be provided with: (1) stoves or hot plates, with a minimum equivalent of two burners, in a ratio of 1 stove or hot plate to 10 persons, or 1 stove or hot plate to 2 families; and (2) adequate food storage shelves and a counter for food preparation; and (3) mechanical refrigeration for food at a temperature of not more than 45° F.; and (4) tables and chairs or equivalent seating adequate for the intended use of the facility; and (5) adequate sinks with hot and cold water under pressure; and (6) adequate lighting and ventilation; and (7) doors shall be nonabsorbent, easily cleaned materials.

(c) When central mess facilities are provided, the kitchen and mess hall shall be in proper proportion to the capacity of the housing and shall be separate from the sleeping quarters. The physical facilities, equipment and operation shall be in accordance with provisions of applicable State codes.

(d) Wall surface adjacent to all food preparation and cooking areas shall be of nonabsorbent, easily cleaned material. In addition, the wall surface adjacent to cooking areas shall be of fire-resistant material.

§ 620.14 Garbage and other refuge.

(a) Durable, fly-tight, clean containers in good condition of a minimum capacity of 20 gallons, shall be provided adjacent to each housing unit for the storage of garbage and other refuse. Such containers shall be provided in a minimum ratio of 1 per 15 persons.

(b) Provisions shall be made for collection of refuse at least twice a week, or more often if necessary. The disposal of refuse, which includes garbage, shall be in accordance with State and local law.

§ 620.15 Insect and rodent control.

Housing and facilities shall be free of insects, rodents and other vermin.

§ 620.16 Sleeping facilities.

(a) Sleeping facilities shall be provided for each person. Such facilities shall consist of comfortable beds, cots or bunks, provided with clean mattresses.

(b) Any bedding provided by the housing operator shall be clean and sanitary.

(c) Triple deck bunks shall not be provided.

(d) The clear space above the top of the lower mattress of a double deck bunk and the bottom of the upper bunk shall be a minimum of 27 inches. The distance from the top of the upper mattress to the ceiling shall be a minimum of 36 inches.

(e) Beds used for double occupancy may be provided only in family accommodations.

§ 620.17 Fire, safety and first aid.

(a) All buildings in which people sleep or eat shall be constructed and maintained in accordance with applicable State or local fire and safety laws.

(b) In family housing and housing units for less than 10 persons, of one story construction, two means of escape shall be provided. One of the two required means of escape may be a readily accessible window with an openable space of not less than 24 x 24 inches.

(c) All sleeping quarters intended for use by 10 or more persons, central dining facilities, and common assembly rooms shall have at least two doors remotely separated so as to provide alternate means of escape to the outside or to an interior hall.

(d) Sleeping quarters and common assembly rooms on the second story shall have a stairway, and a permanent affixed exterior ladder or a second stairway.

(e) Sleeping and common assembly rooms located above the second story shall comply with the State and local fire and building codes relative to multiple story dwellings.

(f) Fire extinguishing equipment shall be provided in a readily accessible place located not more than 100 feet from each housing unit. Such equipment shall provide protection equal to a 2½ gallon stored pressure or 5 gallon pump-type water extinguisher.

(g) First aid facilities shall be provided and readily accessible for use at all time. Such facilities shall be equivalent to the 15 unit first aid kit recommended by the American Red Cross and provided in a ratio of 1 per 50 persons.

(h) No flammable or volatile liquids or materials shall be stored in or adjacent to rooms used for living purposes, except for those needed for current household use.

(i) Agricultural pesticides and toxic chemicals shall not be stored in the housing area.

(F.R. Doc. 68-13135; Filed, Oct. 30, 1933; 8:45 a.m.)

OR 29 CRF 1910.142 - Temporary Labor Camps

(a) Site.

(1) All sites used for camps shall be adequately drained. They shall not be subject to periodic flooding, nor located within 200 feet of swamps, pools, sink holes, or other surface collections of water unless such quiescent water surfaces can be subjected to mosquito control measures. The camp shall be located so the drainage from and through the camp will not endanger any domestic or public water supply. All sites shall be grated, drenched, and rendered free from depressions in which water may become a nuisance.

(2) All sites shall be adequate in size to prevent overcrowding of necessary structures. The principal camp area in which food is prepared and served and where sleeping quarters are located shall be at least 500 feet from any area in which livestock is kept.

(3) The grounds and open areas surrounding the shelters shall be maintained in a clear, and sanitary condition free from rubbish, debris, waste paper, garbage, or other refuse.

(4) Whenever the camp is closed for the season or permanently, all garbage, manure, and other refuse shall be collected and so disposed of as to prevent nuisance. All abandoned privy pits shall be filled with earth and the grounds and buildings left in a clean and sanitary condition. If privy buildings remain, they shall be locked or otherwise secured to prevent entrance.

(b) Shelter.

(1) Every shelter in the camp shall be constructed in a manner which will provide protection against the elements.

(2) Each room used for sleeping purposes shall contain at least 50 square feet of floor space for each occupant. At least a 7 foot ceiling shall be provided.

(3) Beds, cots, or bunks, and suitable storage facilities such as wall lockers for clothing and personal articles shall be provided in every room used for sleeping purposes. Such beds or similar facilities shall be spaced not closer than 36 inches both laterally and end to end, and shall be elevated at least 12 inches from the floor. If double-deck bunks are used, they shall be spaced not less than 48 inches both laterally and end to end. The minimum clear space between the lower and upper bunk shall be not less than 27 inches. Triple-deck bunks are prohibited.

(4) The floors of each shelter shall be constructed of wood, asphalt, or concrete. Wooden floors shall be of smooth and tight construction. The floors shall be kept in good repair.

(5) All wooden floors shall be elevated not less than 1 foot above the ground level at all points to prevent dampness and to permit free circulation of air beneath.

(6) Nothing in this section shall be construed to prohibit "banking" with earth or other suitable material around the outside walls in areas subject to extreme low temperatures.

(7) All living quarters shall be provided with windows the total of which shall be not less than one-tenth of the floor area. At least one-half of each window shall be so constructed that it can be opened for purposes of ventilation.

(8) All exterior openings shall be effectively screened with 16-mesh material. All screen doors shall be equipped with self-closing devices.

(9) In a room where workers cook, live, and sleep a minimum of 100 square feet per person shall be provided. Sanitary facilities shall be provided. Sanitary facilities shall be provided for storing and preparing food.

(10) In camps where cooking facilities are used in common, stoves (in ratio of one stove to 10 persons or one stove to two families) shall be provided in an enclosed and screened shelter. Sanitary facilities shall be provided for storing and preparing food.

(11) All heating, cooking, and water heating equipment shall be installed in accordance with State and local ordinances, codes and regulations governing such installations. If a camp is used during cold weather, adequate heating equipment shall be provided.

(c) Water supply.

(1) An adequate and convenient water supply, approved by the appropriate health authority, shall be provided in each camp for drinking, cooking, bathing, and laundry purposes.

(2) A water supply shall be deemed adequate if it is capable of delivering 35 gallons per person per day to the campsite at a peak rate of 2½ times the average hourly demand.

(3) The distribution lines shall be capable of supplying water at normal operating pressures to all fixtures for simultaneous operation. Water outlets shall be distributed throughout the camp in such a manner that no shelter is more than 100 feet from a yard hydrant if water is not piped to the shelters.

(4) Where water under pressure is available, one or more drinking fountains shall be provided for each 100 occupants or fraction thereof. The construction of drinking fountains shall comply with ANSI Standard Specifications for Drinking Fountains, Z4.2-1942 Common drinking cups are prohibited.

(d) Toilet facilities

(1) Toilet facilities adequate for the capacity of the camp shall be provided.

(2) Each toilet room shall be located so as to be accessible without any individual passing through any sleeping room. Toilet rooms shall have a window not less than 6 square feet in area opening directly to the outside area or otherwise be satisfactorily ventilated. All outside openings shall be screened with 16-mesh material. No fixture, water closet, chemical toilet, or urinal shall be located in a room used for other than toilet purposes.

(3) A toilet room shall be located within 200 feet of the door of each sleeping room. No privy shall be closer than 100 feet to any sleeping room, dining room, lunch area, or kitchen.

(4) Where the toilet rooms are shared, such as in multifamily shelters and in barracks type facilities, separate toilet rooms shall be provided for each sex. These rooms shall be distinctly marked "for men" and "for women" by signs printed in English and in the native language of the persons occupying the camp, or marked with easily understood pictures or symbols. If the facilities for each sex are in the same building, they shall be separated by solid walls or partitions extending from the floor to the roof or ceiling.

(5) Where toilet facilities are shared, the number of water closets or privy seats provided for each sex shall be based on the maximum number of persons of that sex which the camp is designed to house at any one time, in the ratio of one such unit to each 15 persons, with a minimum of two units for any shared facility.

(6) Urinals shall be provided on the basis of one unit or 2 linear feet of urinal trough for each 25 men. The floor from the wall and for a distance not less than 15 inches measured from the outward edge of the urinals shall be constructed of materials impervious to moisture. Where water under pressure is available, urinals shall be provided with an adequate water flush. Urinal troughs in privies shall drain freely into the pit or vault and the construction of this drain shall be such as to exclude flies and rodents from the pit.

(7) Every water closet installed on or after August 31, 1971, shall be located in a toilet room.

(8) Each toilet room shall be lighted naturally, or articicially by a safe type of lighting at all hours of the day and night.

(9) An adequate supply of toilet paper shall be provided in each privy, water closet, or chemical toilet compartment.

(10) Privies and toilet rooms shall be kept in a sanitary condition. They shall be cleaned at least daily.

(e) Sewage disposal facilities.

In camps where public sewers are available, all sewer lines and floor drains from buildings shall be connected thereto.

(f) Laundry, handwashing, and bathing facilities.

(1) Laundry, handwashing, and bathing facilities shall be provided in the following ratio:

(i) Handwash basin per family shelter or per six persons in shared facilities.

(ii) Shower head for every 10 persons.

(iii) Laundry tray or tub for every 30 persons.

(iv) Slop sink in each building used for laundry, hand washing, and bathing.

(2) Floors shall be of smooth finish but not slippery materials; they shall be impervious to moisture. Floor drains shall be provided in all shower baths, shower rooms, or laundry rooms to remove waste water and facilitate cleaning. All junctions of the curbing and the floor shall be covered. The walls and partitions of shower rooms shall be smooth and impervious to the height of splash.

(3) An adequate supply of hot and cold running water shall be provided for bathing and laundry purposes. Facilities for heating water shall be provided.

(4) Every service building shall be provided with equipment capable of maintaining a temperature of at least 70°F. During cold weather.

(5) Facilities for drying clothes shall be provided.

(6) All service buildings shall be kept clean.

(g) Lighting.

Where electric service is available, each habitable room in a camp shall be provided with at least one ceiling-type light fixture and at least one separate floor-or-wall-type convenience outlet. Laundry and toilet rooms and rooms where people congregate shall contain at least one ceiling-or wall-type fixture. Light levels in toilet and storage rooms shall be at least 20 foot-candles 30 inches from the floor. Other rooms, including kitchens and living quarters, shall be at least 30 foot-candles 30 inches from the floor.

(h) Refuse disposal.

(1) Fly-tight, rodent-tight, impervious, cleanable or single service containers, approved by the appropriate health authority shall be provided for the storage of garbage. At least one such container shall be provided for each shelter on a wooden, metal, or concrete stand.

(2) Garbage containers shall be kept clean.

(3) Garbage containers shall be emptied when full, but not less than twice a week.

(i) Construction and operation of kitchens, dining hall, and feeding facilities.

(1) In all camps where central dining or multiple family feeding operations are permitted or provided, the food handling facilities shall comply with the requirements of the "Food Service Sanitation Ordinance and Code". Part V of the "Food Service Sanitation Manual", U. S. Public Health Service Publication 934 (1965).

(2) A properly constructed kitchen and dining hall adequate in size, separate from the sleeping quarters of any of the workers or their families, shall be provided in connection with all food handling facilities. There shall be no direct opening from living or sleeping quarters into a kitchen or dining hall.

(3) No person with any communicable disease shall be employed or permitted to work in the preparation, cooking, serving, or other handling of food, foodstuffs, or materials used therein, in any kitchen or dining room operated in connection with a camp or regularly used by persons living in a camp.

(j) Insect and rodent control.

Effective measures shall be taken to prevent infestation by and harborage of animal or insect vectors or pests.

(k) First aid.

(1) Adequate first aid facilities approved by a health authority shall be maintained and made available in every labor camp for the emergency treatment of injured persons.

(2) Such facilities shall be in charge of a person trained to administer first aid and shall be readily accessible for use at all times.

(l) Reporting communicable disease.

(1) It shall be the duty of the camp superintendent to report immediately to the local health officer the name and address of any individual in the camp known to have or suspected of having a communicable disease.

(2) Whenever there shall occur in any camp a case of suspected food poisoning or an unusual prevalence of any illness in which fever, diarrhea, sore throat, vomiting, or jaundice is a prominent symptom, it shall be the duty of the camp superintendent to report immediately the existence of the outbreak to the health authority by telegram or telephone.

Appendix B - Pesticide Standards

Chapter XVII - Occupational Safety and Health Administration, Department of Labor

Part 1910 - Occupational Safety and Health Standards

Emergency Temporary Standard for Exposure to Organophosphorous Pesticides

Pursuant to section 6(c) of the Williams-Steiger Occupational Safety and Health Act of 1970 (29 U.S.C. 655) and Secretary of Labor's order No. 12-71 (36 FR 8754) part 1910 of title 29, Code of Federal Regulations, is hereby amended in the manner set forth below, in order to provide an emergency temporary standard dealing with the exposure of employees to pesticides.

During the last several years, general awareness of, and concern with, the hazards presented by the use of pesticides have been increasingly felt and expressed. The legislative history of the Williams-Steiger Occupational Safety and Health Act of 1970 itself demonstrates this awareness. The pertinent Senate report states the following:

> Pesticides, herbicides and fungicides used in the agricultural industry have increasingly become recognized as a particular source of hazard to large numbers of farmers and farmworkers. One of the major classifications of agricultural chemicals-the organophosphates-has a chemical similarity to commonly used agents of chemical and biological warfare, and exposure, depending on degree causes headache, fever, nausea, convulsions, long term psychological effects or death. Another group-the chlorinated hydrocarbons-are stored in fatty tissues of the body, and have been identified as causing mutations, sterilization and death.
>
> While the full extent of the effect that such chemicals have had upon those working in agriculture is totally unknown, an official of the Department of Health, Education and Welfare stated during hearings of the Migratory Labor Subcommittee that an estimated 800 persons are killed each year as a result of improper use of such pesticides, and another 80,000 injured. Despite the unmistakable danger that these substances present, no effective controls presently exist over their safe use and no effective protections against toxic exposure of farmworkers or others in the rural populace. (S. Rep. No. 91-1282, 91st Cong., 2d Sess, 3-4 (1970).

For some of the background of this statement, see also hearings on S.2193 and S.2788 before the Subcommittee on Labor and Public Welfare 1st and 2d Sess. pt.1, at 736, 737 (1970). In the fall of 1971, the Council on Environmental Quality was asked to study the feasibility of regulating under the Occupational Safety and Health Act of 1970, the exposure of agricultural employees to organophosphorous pesticides. In this environmental message of February 8, 1972, to the Congress, the President stated that measures to protect agricultural workers from adverse exposure to pesticides were essential to a sound national pesticide policy and that he was directing the Departments of Labor and of Health, Education and Welfare to develop standards under the Occupational Safety and Health Act of 1970 to protect agricultural workers from pesticide poisoning. By letter dated February 1972, the President requested the Secretary of Labor to develop such standards in cooperation with the Department of Health, Education and Welfare.

In response to the congressional purpose manifested in the legislative history of the act, and to the directive of the President, plans were immediately developed to investigate and evaluate the dangers connected with the use of pesticides. In June 1972, the Standards Advisory Committee on Agriculture was appointed for the purpose among others, to submit recommendations regarding a standard on pesticides. The committee appointed a special subcommittee to study exclusively the hazards of pesticide poisoning. The subcommittee and the full committee had several meetings, open to the public, at which the hazards of pesticides were discussed. At these meetings members of the public and experts from Federal agencies, such as the Department of Agriculture and the Environmental Protection Agency, participated.

In September 1972, the Migrant Legal Action Program Inc., et.al., filed a petition with the Occupational Safety and Health Administration, setting forth data and arguments for the promulgation of an emergency standard on pesticides. During this time, available literature on pesticide poisoning was reviewed by the staff of the Occupational Safety and Health Administration.

The information presented to us, and obtained by us, makes it clear that the pesticides listed in the standard set out below are highly harmful. The National Institute for Occupational Safety and Health confirms the inherent toxicity of the organophosphorous insecticides and believes that protection for workers exposed to these agricultural chemicals is greatly needed and that the concept of reentry intervals provides an effective means to furnish such protection. The Federal Task Group on Occupational Exposures to Pesticides has identified apples, peaches, grapes, tobacco, oranges, lemons, and grapefruits as crops which pose the greatest hazards to field workers' health on the basis of field

worker contact in cultivation and harvesting, and organophosphorous compounds as pesticides needing priority attention, because they can be cumulative and historically have caused serious health problems.

Accordingly, it is hereby found that:

(1) The pesticides listed in the standard below are highly toxic;

(2) That premature exposure to them would pose a grave danger;

(3) That farmworkers have in the past growing seasons, are now, and are expected to be in the near future exposed to these pesticides; and

(4) That the standard set out below, based on the recommendations of the Standards Advisory Committee on Agriculture and suggested field reentry safety intervals from the Environmental Protection Agency, is necessary to regulate such exposure so as to protect the workers from the danger.

Pursuant to section 6(c) of the act, a proceeding will commence shortly in accordance with section 6(b) of the act, in which the emergency temporary standard will serve as a proposed rule, together with other subsidiary rules.

Before or during the proceeding under section 6(b) a draft environmental impact statement will be filed with the Council on Environmental Quality and copies will be sent to other appropriate Federal agencies for their comments. In addition, a copy of the proposed rules to be noticed under section 6(b) will be sent to the Environmental Protection Agency for its comments. We will also continue to consult with Federal agencies having expertise on the questions encountered, particularly the Environmental Protection Agency and the National Institute for Occupational Safety and Health, and will continue to give careful consideration to their views.

We recognize the importance that the action taken for the protection of employees be consistent with any action which is taken under the Federal Environmental Pesticide Control Act of 1972, which amended the Federal Insecticide, Fungicide, and Rodenticide Act, for public protection. Accordingly, this emergency temporary standard has been discussed with the Environmental Protection Agency. 1. Part 1910 is amended by adding a new §1910.267a to read as follows:

1910.267a Pesticides.

(a) General requirements.

(1) Scope.

This section contains standards relating to operations in which one or more of the crops specified in Table I of this section are treated with one or more of the pesticides listed in Table I.

(2) Definitions.

(i) "Pesticide" means any substance or mixture of substances which is a pesticide within the meaning of this word in the Federal Environmental Pesticide Control Act of 1972 and which is listed in Table I of this section.

(ii) "Field reentry safety interval" means the period of time in days, each day of 24 hours, that must elapse after a field is treated with a pesticide before employees that may have contact with the treated foliage may be permitted to enter the field.

(iii) "Field" means any area upon which one or more of the crops specified in Table I are grown, but does not include enclosed structures, such as greenhouses.

(b) Application and field reentry.

(1) No employer shall permit the spraying, application or other use of a pesticide on any part of a field unless all employees, other than the applicators of the pesticide, have first been removed from that part of the field.

(2) No employer shall permit any employee to enter any part of a field treated with a pesticide before the passage of the applicable field reentry safety interval prescribed in Table I of this section, except as otherwise provided in paragraph (c)(1) of this section. Where a crop is treated with more than one pesticide, entry into the field shall be prohibited until passage of the longest of the applicable field reentry safety intervals.

(3) Warnings.

(i) When employees are expected to be working in the vicinity of a field to be treated with a pesticide, the employees shall be treated with a pesticide, the employees shall be timely warned. The warning shall be given by posting warning signs both at the usual points of entrance to the field, and on bulletin boards at points where the employees usually assemble for instructions. Where an employer has reason to believe that any employee is unable to read, he shall give the employee oral warning. Posted signs shall be maintained for the duration of the applicable field reentry safety interval, and, upon the expiration of the interval, should be removed immediately.

(ii) The warnings shall include at least the following information given in the English language and any other language which may be necessary to communicate the warning to employees:

(A) The name of the pesticide or pesticides used, and the date of the application;

(B) The name of the crop treated;

(C) The location and boundaries of the field or section of the field treated;

(D) The date the applicable field reentry safety interval expires; and

(E) Instruction to stay out of the field until the expiration of the field reentry safety interval.

(iii) Warnings shall also include the legend "Danger" and "Do Not Enter", and, when posted, shall be displayed with letter sizes and styles so as to be legible at a distance of no less than 25 feet. The posted warning signs shall be of such durability and construction that they remain clearly legible for the duration of the field reentry safety interval.

(iv) The information on each warning to be given orally, or posted, shall be recorded and maintained for at least 1 year. The record shall be available for inspection and copying to representatives of the Assistant Secretary of Labor for Occupational Safety and Health.

(c) Limited field reentry.

(1) Operations.

Employees may be permitted to enter a field before the expiration of the field reentry safety interval prescribed in table I of this section, for evaluation of the effectiveness of the pesticide treatment, spraying, frost protection, maintenance of equipment within the field, such as irrigation piping, and other special activities which cannot reasonably be delayed, provided the employees are protected with the equipment and clothing indicated in table II of this section. Such equipment and clothing shall be provided by the employer.

(2) Use and care of protective clothing and equipment.

(i) All protective clothing, required by table II of this section, shall be thoroughly washed or disposed of after each day's use.

(ii) All respirators and gas masks shall be cleaned and maintained in accordance with § 1910.134(f).

(iii) Any employer who gives pesticide-contaminated clothing or equipment to another person for laundering, cleaning, or maintenance shall inform such person of the warnings and precautions to be taken, as described on the label of the pesticide which has contaminated the clothing or equipment.

(iv) When protective clothing or equipment is cleaned or washed, the process shall be conducted in a manner that will prevent wash-water wastes from the clothing or equipment from creating a hazard to the health of employees.

(v) When the same clothing or equipment is to be used by more than one employee in a given day, the clothing or equipment shall be adequately washed or cleaned before it is passed from one employee to another.

(vi) When the protective clothing becomes contaminated with a pesticide to the extent that the skin could become contaminated, the clothing shall be removed and the skin washed.

(d) Medical services and first-aid.

(1) The employer shall make arrangements to provide necessary medical assistance to employees who may suffer injuries or illnesses by reason of occupational exposure to pesticides.

(2) The employer shall insure that each leader or foreman is instructed to recognize early symptoms of organophosphorous pesticide poisoning and to take appropriate protective measures.

2. Section 1910.267 is revised to read as follows:

§ 1910.267 Agricultural operations.

(a) Agricultural operations.

(1) The standards referenced in the remaining subparagraphs of this paragraph apply to the indicated operations, whether or not they are agricultural operations.

(2) Sanitation in temporary labor camps § 1910.142.

(3) Storage and handling of anhydrous ammonic, § 1910.111 (a) and (b).

(4) Pulpwood logging, § 1910.266.

(5) Slow-moving vehicles, § 1910.145.

(6) Pesticides, § 1910.267a.

(b) Except to the extent specified in paragraph (a) of this section, the standards contained in subparts B through S of this part do not apply to agricultural operations.

Effective date.

These amendments shall become effective June 18, 1973. The delay in effective date is to afford affected persons a reasonable and necessary period for adjusting to the standard. Any employer subject to § 1910.267a shall comply therewith, even though a label registered with the Environmental Protection Agency requires a shorter field reentry safety interval. On the other hand, compliance with § 1910.267a does not excuse any person from complying with such a label.

(Sec. 6(c), Public Law 91-596, 84 Stat. 1596, 29 U.S.C. 655. Secretary's Order No. 12-71, 36 FR 8754.)

Signed at Washington D.C. this 19th day of April 1973. John H. Stender, Assistant Secretary of Labor for Occupational Safety and Health (FR Doc. 73-8366, Filed 4-30-73; 8:45 a.m.)

TABLE I—FIELD REENTRY SAFETY INTERVALS IN DAYS FOR CROPS TREATED WITH ORGANOPHOSPHOROUS PESTICIDES

	Oranges, lemons, and grapefruits		Peaches		Grapes		Tobacco		Apples	
	Dry area	Wet area[1]	Dry area	Wet area[1]	Dry area	Wet area[1]	Dry area	Wet area[1]	Dry area	Wet area[1]
Azinphosmethyl (Guthion)	14	5	10	5	14	5	5	5	5	5
Carbophenothion (Trithion)	14	5	14	5	14	5			5	5
Demeton (Systox)	5	5	5	5	5	5			5	5
Diazinon	2	2	2	2	2	2	2	2	2	2
Dimethoate (Cygon)	2	2					2	2	2	2
Dioxathion (Delnav)	2	2	2	2	2	2			2	2
Disulfoton (DiSyston)							3	3		
EPN	14	5	10	5	10	5			5	5
Ethion	14	5	5	5	5	5			5	5
Imidan (Prolate)			2	2	2	2			2	2
Malathion	2	2	2	2	2	2	2	2	2	2
Methyl parathion			10	5	14	5	5	5	5	5
Mevinphos (Phosdrin)	1	1	1	1	1	1			1	1
Monocrotophos (Azodrin)							1	1		
Naled (Dibrom)	3	3	3	3	3	3	3	3		
Oxydemetonmethyl (Meta-Systox R)	5	5	5	5	5	5				
Parathion	14	5	10	5	14	5	[2]7A [3]3B	[2]5A [3]2B	5	5
Phosalone (Zolone)					10	5			5	5
Phosphamidon (Dimecron)	14	5							5	5
TEPP	3	3	3	3					3	3
Trichlorfon (Dylox)							2	2		

[1] An area where moderate rainfall has occurred, or a moderate wash has been applied, after pesticide application
[2] A—Plant bed tobacco.
[3] B—Field tobacco.

TABLE II—MINIMUM PROTECTION FOR EMPLOYEES ENTERING FIELDS PRIOR TO THE EXPIRATION OF FIELD REENTRY SAFETY INTERVALS SPECIFIED IN TABLE I

If the principal route of exposure to the employee is expected to be by	The employee shall be provided with, shall be required to wear, and shall be given instructions for the proper use of:
Inhalation and/or ingestion	Approved reusable or single use dust respirator;[1] or approved chemical cartridge respirator or gas mask.[1]
Skin	Coveralls or other whole body coverings, gloves, hat, and impermeable shoe covering.[2]

[1] Respirators approved by the U.S. Department of Health, Education, and Welfare (National Institute for Occupational Safety and Health) and U.S. Department of Interior (Bureau of Mines), under the provisions of 30 CFR Part 11.

[2] To be used where the pesticides disulfoton, parathion, TEPP, and methyl parathion are encountered.

[3] The protective clothing provided shall be a waterproof, closely woven fabric to prevent contact with the pesticide.

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FTS & Comm: 918-581-7151

Thomas T. Curry
U.S. Department of Labor
Occupational Safety and
Health Administration
307 Central Nat'l. Bank Bldg.
Houston, Texas 77002
FTS & Comm: 713-226-5431

John K. Parsons
U.S. Department of Labor
Occupational Safety and
Health Administration
546 Carondelet St.-4th Fl.
New Orleans, Louisiana 70130

Kansas City - Region VII

Robert J. Borchardt
U.S. Department of Labor
Occupational Safety and
Health Administration
1627 Main Street-Room 1100
Kansas City, Missouri 64103
FTS & Comm: 816-374-2756

Angelo F. Castranova
U.S. Department of Labor
Occupational Safety and
Health Administration
210 North 12th Blvd.-Room 554
St. Louis, Missouri 63101
FTS & Comm: 314-622-5461

Warren P. Wright
U.S. Department of Labor
Occupational Safety and
Health Administration
City National Bank Bldg.
Room 803
Harney and 16th Street
Omaha, Nebraska 63102
FTS & Comm: 402-221-3276/7

Denver - Region VIII

Jerome J. Williams
U.S. Department of Labor
Occupational Safety and
Health Administration
Squire Plaza Building
8527 W. Colfax Avenue
Lakewood, Colo. 80215
FTS & Comm: 303-234-4471

Vernon A. Strahm
U.S. Department of Labor
Occupational Safety and
Health Administration
Suite 525-Petroleum Bldg.
2612 1st Avenue North
Billings, Montana 59101
FTS: 406-245-6640/6649
Comm: 406-245-6711 (x 6640)

Charles F. Hines
U.S. Department of Labor
Occupational Safety and
Health Administration
Suite 309
Executive Building
455 East 4th South
Salt Lake City, Utah 84111
FTS & Comm: 801-524-5080

San Francisco - Region IX

Donald T. Pickford
U.S. Department of Labor
Occupational Safety and
Health Administration
100 McAllister Street
Room 1706
San Francisco, Calif. 94102
FTS & Comm: 415-566-0536

Lawrence E. Gromachey
U.S. Department of Labor
Occupational Safety and
Health Administration
Suite 910-Amerco Towers
2721 North Central Ave.
Phoenix, Arizona 85004
FTS & Comm: 602-261-4857/8

Anthony Mignano
U.S. Department of Labor
Occupational Safety and
Health Administration
Hartwell Bldg.-Rm. 514
19 Pine Avenue
Long Beach, Calif. 90802
FTS: 213-831-9281, then ask
Long Beach FTS Operator
for 424-3434
Comm: 213-432-3434

Paul F. Haygood
U.S. Department of Labor
Occupational Safety and
Health Administration
333 Queen Street #505
Honolulu, Hawaii 96813
FTS & Comm: 808-546-5157

Seattle - Region X

Richard L. Bueston
U.S. Department of Labor
Occupational Safety and
Health Administration
506 Second Avenue
1906 Smith Tower Building
Seattle, Washington 98104
FTS & Comm: 206-442-7520/7527

Eugene Harrower
U.S. Department of Labor
Occupational Safety and
Health Administration
Room 526-Pittock Block
921 S.W. Washington St.
Portland, Oregon 97205
FTS & Comm: 503-221-2251

U.S. Department of Labor
Occupational Safety and
Health Administration
Federal Building, Room 227
605 W. 4th Avenue
Anchorage, Alaska 99501
FTS: Dial Local FTS Operator
ask for 907-272-5561 (x 851)
Comm: 907-272-5561 (x 851)

Appendix D - Complaint Form

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
SUGGESTED COMPLAINT FORM AND CITATION FORMS

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Form Approved
OMB No. 44R1449

For Official Use Only		
Area	Date Received	Time
Region	Received By	

OSHA-7

COMPLAINT

This form is provided for the assistance of any complainant and is not intended to constitute the exclusive means by which a complaint may be registered with the U.S. Department of Labor.

The undersigned *(check one)*

☐ Employee ☐ Representative of employees ☐ Other *(specify)* _____

believes that a violation at the following place of employment of an occupational safety or health standard exists which is a job safety or health hazard.

Does this hazard(s) immediately threaten death or serious physical harm? ☐ Yes ☐ No

Employer's Name _____

Address (Street _____ Telephone _____
(City _____ State _____ Zip Code _____

1. Kind of business _____

2. Specify the particular building or worksite where the alleged violation is located, including address. _____

3. Specify the name and phone number of employer's agent(s) in charge.

4. Describe briefly the hazard which exists there including the approximate number of employees exposed to or threatened by such hazard.

(Continue on reverse side if necessary)

Sec. 8(f)(1) of the Williams-Steiger Occupational Safety and Health Act, 29 U.S.C. 651, provides as follows: Any employees or representative of employees who believe that a violation of a safety or health standard exists that threatens physical harm, or that an imminent danger exists, may request an inspection by giving notice to the Secretary or his authorized representative of such violation or danger. Any such notice shall be reduced to writing, shall set forth with reasonable particularity the grounds for the notice, and shall be signed by the employees or representative of employees, and a copy shall be provided the employer or his agent no later than at the time of inspection, except that, upon request of the person giving such notice, his name and the names of individual employees referred to therein shall not appear in such copy or on any record published, released, or made available pursuant to subsection (g) of this section. If upon receipt of such notification the Secretary determines there are reasonable grounds to believe that such violation or danger exists, he shall make a special inspection in accordance with the provisions of this section as soon as practicable, to determine if such violation or danger exists. If the Secretary determines there are no reasonable grounds to believe that a violation or danger exists he shall notify the employees or representative of the employees in writing of such determination.

Appendix E - Regional Administrators

Boston - Region I

Donald E. McKenzie, Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
Fourth Floor-18 Oliver Street
Boston, Massachusetts 02110
FTS & Comm: 617-223-6712/3/4

New York - Region II

Alfred Barden
Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
1515 Broadway (1 Astor Plaza)
New York, New York 10036
FTS & Comm: 212-971-5941/2

Philadelphia - Region III

David H. Rhone, Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
15220 Gateway Center
3535 Market Street
Philadelphia, Pa. 19104
FTS & Comm: 215-597-1206

Atlanta - Region IV

Basil A. Needham, Jr.
Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
1375 Peachtree Street, N.E.-Suite 587
Atlanta, Georgia 30309
FTS & Comm: 404-526-3573/4

Chicago - Region V

Edward E. Estkowski, Regional Administrator
U. S. Department of Labor
Occupational Safety and Health Administration
300 South Wacker Drive #1201
Chicago, Illinois 60606
FTS & Comm: 312-353-4716/7

Dallas - Region VI

John K. Barto, Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
1512 Commerce St.-7th Fl.
Dallas, Texas 75201
FTS & Comm. 214-749-2477/8/9

Kansas City - Region VII

Joseph A. Reidinger, Regional Administrator
U. S. Department of Labor
Occupational Safety and Health Administration
823 Walnut Street
Waltower Building-Rm. 300
Kansas City, Missouri 64106
FTS & Comm: 816-374-5249/0

Denver - Region VIII

Howard J. Schulte, Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
1961 Stout Street-Rm. 15010
Denver, Colorado 80202
FTS & Comm:303-837-3883

San Francisco - Region IX

Gabriel Gilletti, Regional Administrator
U.S. Department of Labor
Occupational Safety and Health Administration
450 Golden Gate Avenue
San Francisco, Calif. 94102
FTS & Comm: 415-556-0354

Seattle - Region X

James W. Lake, Regional Administrator
U. S. Department of Labor
Occupational Safety and Health Administration
1808 Smith Tower Building
506 Second Avenue
Seattle, Washington 98104
FTS & Comm: 206-442-5930